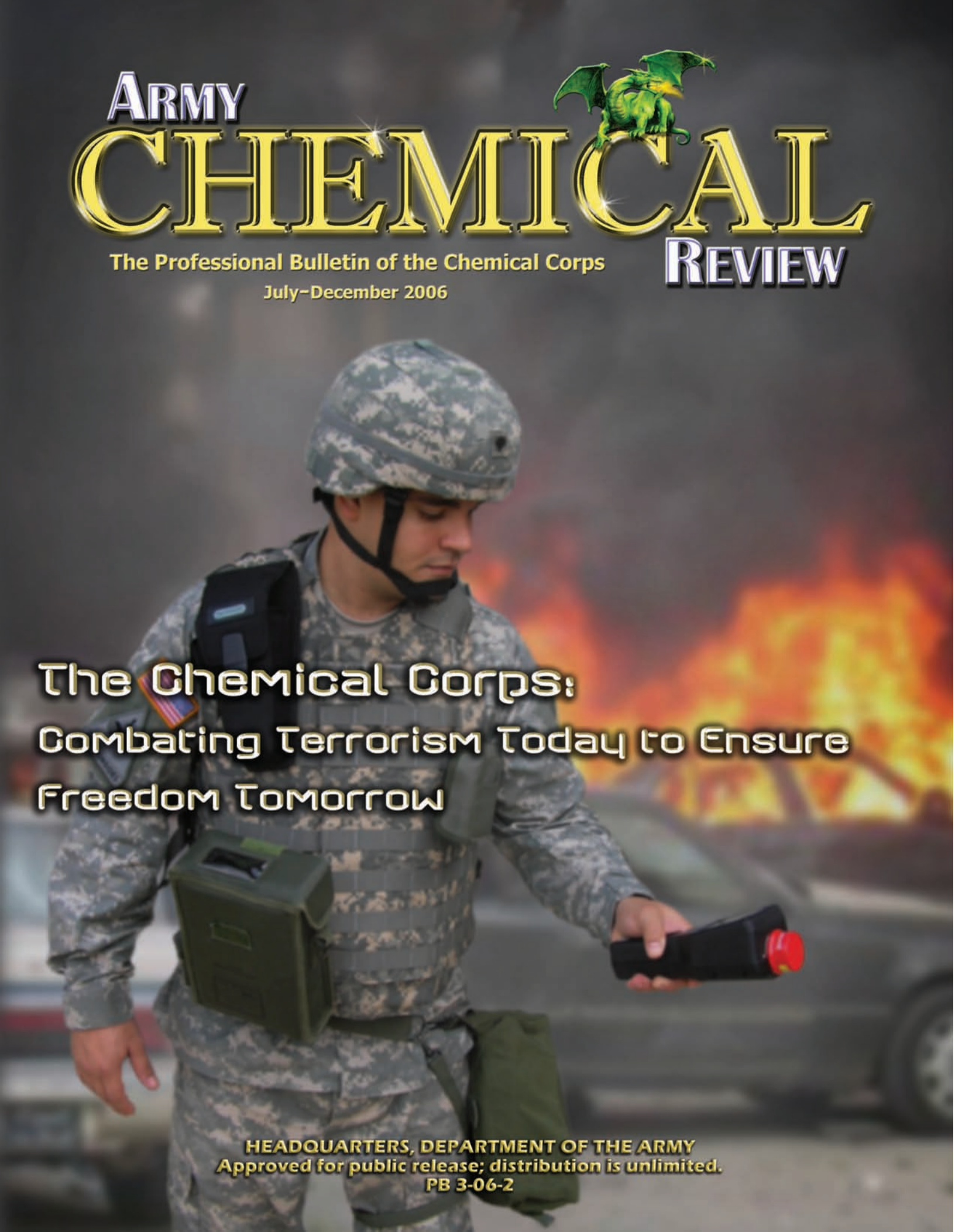
ARMY CHEMICAL REVIEW

The Professional Bulletin of the Chemical Corps
July-December 2006



The Chemical Corps: Combating Terrorism Today to Ensure Freedom Tomorrow

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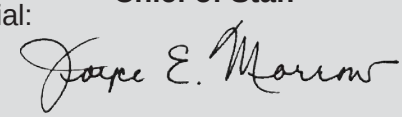

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Covers:
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Front Cover: A CBRN specialist uses a gamma spectrometer during training to identify the source of radiation following the simulated detonation of an improvised explosive device. Photograph provided by the USACMLS Proponency Office.
Back Cover: Photographs of the USACMLS Change of Command ceremony (provided by the Visual Information Center, Fort Leonard Wood, Missouri).

ARMY CHEMICAL REVIEW

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Corrections

The information contained in paragraph fourteen of "The 86th Chemical Mortar Battalion: Devotion to Duty" article in our July–December 2005 issue should have been credited to Dave Kaufman, "86th Chemical Mortar Battalion," *The Trading Post*, Winter (January–March) 1996, p. 11.

MG (Ret.) Ralph G. Wooten was erroneously identified as a MSG on page 51 of our January–June 2006 issue.

Chief of Chemical

Colonel Thomas Spoehr

Greetings Dragon Soldiers! During a ceremony at Fort Leonard Wood, Missouri, on 29 June 2006, I had the honor of assuming the title of 24th Chief of Chemical and Commandant of the U.S. Army Chemical School from Brigadier General Stan Lillie. Brigadier General Lillie served as our Chief for three years; his magnificent leadership and selfless service helped bring about countless improvements to our Corps and its capabilities. He positively impacted thousands of Soldiers during his visits to the field and to training locations at Fort Leonard Wood—home of the Chemical Corps. As a result of his leadership and vision, our Corps is at the forefront of Department of Defense efforts to combat weapons of mass destruction and contributes true capability to the joint force. Brigadier General Lillie has moved on to assume the duties of Director of Integration, Headquarters, Department of the Army, G-8, Washington, D.C. He will be responsible for the synchronization and coordination of equipping the Army's modular force. When you see or encounter Brigadier General Lillie, please thank him and his wife Bonita for their great contributions to the Corps. Brigadier General Lillie remains the senior Chemical Corps officer and has promised to remain engaged and supportive of the Corps mission and vision.

I could not be more honored or excited to serve as your Chief. After being gone for three years, my wife Cynthia and I are delighted to return to Fort Leonard Wood and find numerous improvements (too many to mention!) complete or well underway. The First Lieutenant Joseph Terry CBRN Responders Training Facility, due to be completed in fiscal year 2007, will provide unprecedented incident response training. We have incorporated warrior tasks and battle drills into our training for officers and enlisted personnel and will start training with biological and radiological hazards (in addition to the chemical agents used in the Chemical Decontamination Training Facility).

There is a great leadership team at the Chemical School, and they have managed the transition of commandants without missing a beat. We could not be more fortunate to have these leaders—Soldiers like Command Sergeant Major Patrick Alston, Regimental Command Sergeant Major; Colonel Gary Wallace, Assistant Commandant; Colonel Les Smith, Commander, 3d Chemical Brigade; Command Sergeant Major Stan Kusko, Command Sergeant Major, 3d Chemical Brigade; and a host of others—all focused on training, preparing, and taking care of Dragon Soldiers. I will be relying on their wise advice and counsel.

Command Sergeant Major Alston and I visited Fort Lewis, Washington, in July and had the privilege of attending the I Corps Chemical Conference and Green Dragon Ball and witnessing the change of command for the 23d Chemical Battalion. All the Dragon Soldiers we saw—and we saw a lot—were highly motivated professionals. They made us truly proud! In true Dragon Soldier fashion, all events were executed superbly. Fort Lewis is now a center of excellence for our Corps, with the 23d Chemical Battalion, the 110th Chemical Battalion (Technical Escort), the 10th Civil Support Team, Chemical detachments in the 1st Special Forces Group, reconnaissance platoons in two Stryker brigades, the 476th Chemical Battalion (U.S. Army Reserve), and the 420th Chemical Battalion (Army National Guard) all in close proximity. You could serve an entire Chemical career at Fort Lewis, never do the same job twice, and still have plenty of opportunities available.

We also attended the National Capital Region Green Dragon Ball on 14 July at Fort Belvoir, Virginia. It was a great event and an outstanding opportunity to enjoy camaraderie with other Chemical Soldiers. We were inspired by the remarks provided by Mr. Jean Reed, Special Assistant for Chemical and Biological Defense and Chemical Demilitarization Programs, Office of the Assistant to the Secretary of Defense. Mr. Reed affirmed the important role the Chemical Corps plays in the defense of our great Nation.

The Chemical Corps vision is almost 2 1/2 years old and has stood the test of time well. It remains the guiding light that leads us to move the Corps forward. However, recognizing that the pace of change in our Army has never been greater, I am reviewing our vision to ensure that it remains relevant and descriptive of where we want to take our Corps. Your input is vital. I will be reaching out to all elements of the Corps in this process, but if you have input that you would like to send me directly, I have established an e-mail account <*chiefofchemical@wood.army.mil*> to receive your input. Feel free to send thoughts on our vision and strategy. Finally, I ask you to look out for fellow members of our Corps—mentor, assist, and coach them.

Elementis, Regamus, Proelium!

Regimental Command Sergeant Major

Command Sergeant Major Patrick Z. Alston

The Chemical Corps: Combating Terrorism Today to Ensure Freedom Tomorrow is a relevant statement used to describe the Dragon Soldiers who continue to meet the transformational challenges of the Corps and the needs of the Army. This Nation is built and structured on the foundations of liberty, peace, and the American dream. Dragon Soldiers are just as critical to the Nation and our victory in the Global War on Terrorism (GWOT) as they are to the joint warfighting campaign.

As a Corps, we must ensure that our Nation is well equipped with the means to detect, mitigate, and decontaminate all forms of agents (standard and nonstandard). In trying to simplify the divergent views on the phenomenon of terrorism, a simple definition emerges: "violence or threatened violence intended to produce fear or change." That fear or change may be prompted by the political or social factors behind individual terrorist acts. In the GWOT campaign, I must emphasize that it is not the job of the Chemical Corps to determine why this evil is present in society today—our job is to focus on defeating terrorist activities as they relate to chemical, biological, radiological, and nuclear threats.

The terrorists of today could attack our Nation with nonstandard chemical agents. These agents could evolve from something as small as household cleaning material or as large as an agent in pure form. Brigadier General Lillie's vision of transforming Chemical Soldiers from conventional Soldiers to "warrior scientists" is helping the Corps get on board with the ever-increasing wave of the Objective Force Warrior concept, designed to enhance warfighter lethality and survivability and prepare forces for defense operations of the future.

In trying to simplify the divergent views on the phenomenon of terrorism, a simple definition emerges: "violence or threatened violence intended to produce fear or change."

Let's take a moment to reflect on what the Corps has been called to do in the past. In the early 80s, the Department of the Army concluded that it was necessary to have a Corps that could respond to nuclear, biological, and chemical agents and was compelled to reestablish the Chemical Corps Regiment. However, during that time, the Corps remained underutilized. During the 90s, the Chemical Corps was called upon during Operations Desert Shield and Desert Storm, and the relevance of the Corps was soon realized. After the threat of chemical and biological agents emerged, the Corps prepared to deal with the threat of conventional agents.

Our mind-set quickly changed when preparation efforts shifted due to the train incident in which a terrorist group launched a coordinated attack using sarin (GB) nerve gas against commuters on a Tokyo subway system. The highly publicized attack killed 12 people and injured more than 5,000. At that time, the leaders of the Chemical Corps understood that they could be called upon to engage terrorist acts with weapons of mass destruction. The Corps needed to transform from a force dealing with conventional warfare to a force supporting homeland security and defense operations. This new focus became more relevant after the events of 11 September 2001. Although agents were not used in the attack, the question remains: What if they had been used? As Chemical units remain relevant regarding traditional and nontraditional threats, we must ensure that this focus remains intact during Operations Iraqi Freedom and Enduring Freedom. The "smoking gun" remains to remind us of the need for a transformation from Soldier to warrior scientist.

To "ensure freedom tomorrow," all Dragon Soldiers must take the opportunity to prepare and educate themselves by remaining focused on learning about the new equipment being fielded and the doctrine being developed. Dragon Soldiers must remain competent, equipped, organized, and trained to combat new threats today to ensure freedom tomorrow.

Farewell

Brigadier General
Stanley H. Lillie

When I became the Chief of Chemical and the Commandant of the U.S. Army Chemical School (USACMLS) in August 2003, we were a nation at war. Today, we continue to prosecute the Global War on Terrorism. We do so with the world's finest military men and women. The contemporary operational environment presents us with new challenges as we face an asymmetric threat. And we face the continued proliferation of weapons of mass destruction by state and nonstate actors.

Through our Vision, we have focused the Chemical Corps to meet the expanding and dynamic operational environment of the future. We continue to evolve our Corps into a responsive, assertive, and comprehensive force—a force that is adaptive to the full range of military operations in foreign areas and within our homeland. I can say with resonant pride that the men and women of the Chemical Corps serve with honor and distinction and remain relevant and ready.

The U.S. Army Chemical Corps is rapidly moving into the 21st century through transformation and change to meet the needs for our national security. And we do so through cooperative partnerships with many, to include the Office of the Secretary of Defense, Joint Program Executive Office, Joint Requirements Office, and Joint Science and Technology Office. There are many other elements that have been active influences on the success of the Chemical Corps—too many to list here, but please know that our gratitude is earnest.

Every command rejoices in success because of the tireless efforts of many—efforts that are synchronized through the effective leadership of a few. My heartfelt appreciation goes out to all the leaders within the USACMLS. Our terrific team (the Maneuver Support Center [MANSCEN] and the USACMLS) at Fort Leonard Wood, Missouri, has been in aggressive pursuit of world-class chemical, biological, radiological, and nuclear (CBRN) defense. The achievements span combat development, training and education, doctrine, and support to the Soldier. This diverse organization has been working diligently to meet the needs of the Warfighter, the Army, and our Nation. We have a wonderful cast of professional military and civilian men and women who are tireless and selfless in achieving our goals. They come to us from the field, from our communities, and from our allies. Without these people, we could not claim to have a CBRN defense program unsurpassed by any other in the world. I cannot exhaust the list of contributions or all the individuals critical to our success, but I want to highlight a few key achievements.

Over the past six years, the USACMLS has worked with numerous acquisition agencies in the development and procurement of the nuclear, biological, and chemical reconnaissance variant (NBCRV), Stryker vehicle. This effort came to fruition in March 2006 when the Chemical Corps and the D Troop, 2-1 Cavalry, 4th Brigade, 2d Infantry Division, received the initial fielding of the NBCRV. This achievement represents the first full-spectrum CBRN reconnaissance and surveillance system delivered to the Army since 1990.

Along with new systems comes force transformation. The structure of Chemical Corps units was totally redesigned. The result is a Chemical force that is tailored to rapidly meet the needs of commanders. With this, we fielded a new Joint Biological Point Detection System (JBPDS). And when the Army sought to reduce our force structure this spring, we successfully defended the need to retain the assets at risk. As the world changes and threats to our Nation evolve, the USACMLS is expanding its role to include combating and eliminating weapons of mass destruction. These initiatives include hazard response capability integrated into general-purpose decontamination platoons.

And with concepts come experiments. Since 2005, we have completed or are working three experiments to expand our efforts in support of future CBRN concepts. We have seven more experiments planned for fiscal years 2006 and 2007. All of these efforts represent the transformation of our Corps from yesterday to today. We are also designing the force of tomorrow with the development of the Future Combat System and corresponding brigade combat teams to ensure that we have Soldiers and combat systems capable of continuous operations and 100 percent effectiveness while completely protected from CBRN hazards.

Our next achievement was 31 years in the making. We regained proponency for technical escort units, formerly under the Ordnance School. Training and doctrine responsibilities remained with the Ordnance School when the

USACMLS relocated to Fort McClellan, Alabama, from Aberdeen Proving Ground, Maryland, in the early 1970s. While training continues at Redstone Arsenal in the near term, the proponent responsibility transferred back to the USACMLS in October 2004.

One of the crowning achievements during my tenure as Chief of Chemical was the elimination of the shortage of sergeants in our enlisted ranks. For more than eight years, the Chemical Corps suffered up to 500 shortages in E5s, creating a tremendous burden for commanders in the field. In May 2005, the Army G-1 adopted our proposal that specialists with 48 months in the Army should be automatically promoted to sergeant. With this, we have exceeded 100 percent strength for the last three months.

The Chemical Corps' role expansion does not stop with technical escort. In 2004, we were designated as the executive agent for the MANSCEN Homeland Security Office. This includes oversight of the chemical, biological, radiological, nuclear, and high-yield explosives (CBRNE) consequence management mission area and the Weapons of Mass Destruction–Civil Support Team program. With this new responsibility came an integrating effort for the Civil Support Skills Course at Fort Leonard Wood, as well as unique reserve component training at Fort Dix, New Jersey.

Another landmark success is the accreditation by Headquarters, U.S. Army Training and Doctrine Command, in November 2005. This result was a combination of coaching, leadership, and sheer force of will to develop and refine training products and their execution so that they meet or exceed prescribed standards. This achievement represents a major milestone when coupled with the successful 2004 MANSCEN Noncommissioned Officer Academy accreditation that included the Chemical Basic and Advanced Noncommissioned Officer Courses.

As we continue to transform and evolve, we continue to adjust our CBRN defense doctrine as the foundation for military operations and training. Most of our doctrine for CBRN operations is now multiservice, with a growing interest in even more joint interdependency.

And as doctrine provides theory, solid training development translates it into excellence in institutional training. All professional courses for the USACMLS were reviewed and revised in the past year. And the Directorate of Training and Training Development is expanding its role beyond the gates of Fort Leonard Wood. Through distributive learning, Dragon Soldiers will be able to expand their professional development by using web-based technology to complete foundation courses in basic chemistry, biology, and radiological studies.

The 3d Chemical Brigade continues to provide superior, quality CBRN readiness training for all Services. This includes initial entry training programs, professional military education, and functional course programs. The 82d Chemical Battalion has been a front-runner in leading change within the initial entry training environment and has proudly trained more than 6,700 Dragon Soldiers for the Corps and our Army. It has completely transformed the training that 74D Soldiers execute in order to better prepare them for the challenges they face. The 84th Chemical Battalion builds on this foundation by training leaders, and the 58th Transportation Battalion offers quality training for 88M Soldiers.

Training excellence requires a premier training environment. Fort Leonard Wood continues to utilize and develop world-class training facilities and simulation capabilities. The Chemical Defense Training Facility boasts a first-rate chemical surety program. Field training has become more realistic, our classrooms and radiation laboratory are more modern than ever, and state-of-the-art technologies are routine.

When Dragon Soldiers cannot come to the USACMLS, we are instituting methods to maintain connectivity for those in the field. Our Web site has been given a complete makeover and contains expanded links to the Center for Army Lessons Learned, the Battle Command Knowledge System, and a professional CBRN discussion forum. Our newly designed military professional bulletin, the *Army Chemical Review*, provides a forum for the exchange of ideas and continues to inform and motivate our Soldiers, while increasing their knowledge and improving their performance.

Our Dragon Soldiers have responded worldwide to fight the Global War on Terrorism. I am humbled by their professional service, valor, and bravery. Our reputation as the best led, the best trained, and the best equipped Army in the world stands without question. The Chemical Corps' contribution to that performance is measured in events not necessarily highlighted by the media, but through day-to-day support to all missions, large or small. To our military members and their families who have served, to those who serve, and to those who have given so much—especially the ultimate sacrifice—thank you on behalf of a grateful Nation, the finest military in the world, and a professional Chemical Corps. It has been an honor and a privilege to serve as your 23d Chief of Chemical and the Commandant of the USACMLS for the past three years. I'm proud to leave you in the very capable hands of Colonel Tom Spoehr.

Dragon Soldiers Welcome New Leader

By Mr. Christian Deluca

The U.S. Army Chemical School (USACMLS) Regimental Review on 29 June 2006 marked the end of a week honoring the work of Dragon Soldiers and the beginning of new leadership. Brigadier General Stanley Lillie, Commandant of the USACMLS and Chief of Chemical, passed command to Colonel Thomas Spoehr, making Colonel Spoehr the 24th officer to lead the Corps.

Serving as commandant since 2003, Lillie oversaw the training of more than 14,000 Chemical Soldiers in a regiment of 21,000 Soldiers. "He set the bar for the Regiment and the Army to achieve (an) incumbent state," said Major General Randal Castro, Commanding General of the Maneuver Support Center and Fort Leonard Wood, Fort Leonard Wood, Missouri. Major General Castro also expressed that there were concerns about replacing Brigadier General Lillie. Would the replacement be able to take on the weight of such a demanding position? Would he continue to look to the future as Brigadier General Lillie had? But the answers to these questions were positive. "We are delighted; we are lucky at Fort Leonard Wood to have the Spoehrs following in the Lillies' footsteps," Castro said. "We are thrilled to have them as a part of our team and a part of our family."

Colonel Spoehr is no stranger to Fort Leonard Wood. He previously commanded the 3d Chemical Brigade and served as the Director of Training from 2001 to 2003. His last assignment was the Director of Material, Deputy Chief of Staff, G-8, Headquarters, Department of the Army. He has been nominated by the President for promotion to brigadier general.

Colonel Spoehr said that there were three emotions he felt while thinking about his new position: excitement, appreciation, and honor. Part of his excitement stems from his return to the Missouri post. He expressed his appreciation to the Fort Leonard Wood community for

Colonel Thomas Spoehr, USACMLS commandant, addresses the Chemical Regiment.

making his move as painless as possible and to Brigadier General Lillie for the job he has done with the Corps. "The Lillies have made a profound difference to our Corps, and we owe them a huge debt of gratitude." Colonel Spoehr also expressed that he is honored to be selected to replace Brigadier General Lillie. "Major General Castro, I am honored that you and the Department of the Army have a belief in me, and in return [I] will commit myself to provide the Army and the joint force the full spectrum [needed to achieve] perfection."

Cynthia and I are extremely excited to return to Fort Leonard Wood to see all the improvements that have been made and to renew old friendships," Spoehr said. Colonel Spoehr and his wife Cynthia have two children, Catherine, 20, and Peter, 16.

Mr. Deluca is a photojournalist for the Fort Leonard Wood Guidon newspaper.

Major General Randal Castro hands Colonel Spoehr the Regimental flag.

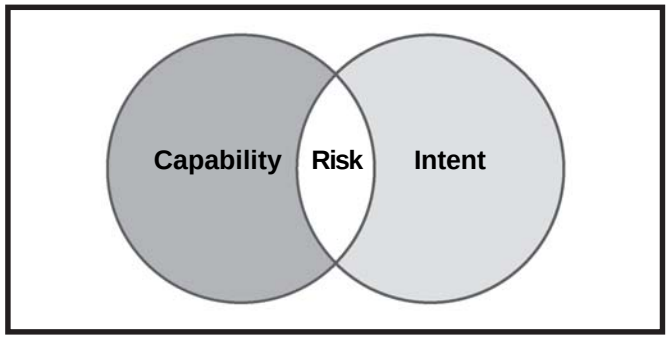
Confronting the Terrorist Dilemma

By Major Ian McCulloh and Second Lieutenant Tony Benedosso

For many people, it is the most frightening scenario imaginable—a terrorist, with scientific know-how, who obtains and releases a highly pathogenic or contagious disease, creating a biological disaster with thousands of victims. But to most people, the possibility of such an attack seems unlikely. As such, the Chemical Corps finds itself in the unfortunate position of validating its existence and justifying that it remains a relevant part of the U.S. military. With this thought in mind, this article will focus on addressing three central questions pertaining to the possibility of a biological attack: Why hasn't there been an attack yet? Will an attack occur? What recommendations are proposed by scientists and biological experts?[1] These recommendations were designed to help the United States prevent a biological attack and to cope with an attack if one occurs.

There are several reasons why there have not been massive biological attacks on the United States. The two essential components needed to organize an attack—capability and intent—can be best explained by showing the elements on a Venn diagram. In order for a biological attack to be successfully carried out, terrorists must possess both of these essential components. To clarify, they must be capable of doing harm and possess an intent that will motivate them to kill many innocent people. When terrorists possess the elements of capability and intent, an intersection of risk is formed (see figure).

There are undoubtedly many terrorists who possess one component but not the other. Certainly, there is not a shortage of people who wish to do harm to the United States. Al-Qaida has demonstrated its intent to inflict as many casualties as possible. Its members would likely use biological agents if they could acquire, weaponize, and deliver them. However, they have not demonstrated the capability to successfully manufacture, weaponize, or employ biological agents. A good example of terrorism is the Japanese cult Aum Shinrikyo. In 1993, the cult attempted to release anthrax spores in Tokyo.[2] Fortunately, they did not correctly weaponize the pathogenic agent. The attack was unsuccessful and resulted in no casualties. In 1995, the cult used sarin gas in the confined space of the Tokyo subway system. This attack resulted in 300 to 400 injuries and 12 deaths. Had the cult understood the effects of weather, among other things, on weaponized agents, their attack might have resulted in a more devastating outcome.



Venn diagram showing intersection of risk

One possible reason for the lack of biologically astute terrorists is the belief of Islamic extremists that biology is a rudimentary and crude form of science.[3] Even those individuals who possess an evil intent and an elementary understanding of science have found that the capability gap is often too much to jump without the expert knowledge of biological agents. Conversely, there are many scientists and laboratory technicians in the United States who do possess the capability to weaponize deadly biological agents.[4] However, as a reporter from *Wired* magazine recently reported, these professionals seem to have a professional ethic that prohibits the misuse of their knowledge.[5]

It is impossible to predict with absolute certainty where, when, or if the United States will fall victim to a massive biological attack. However, one thing is certain—the once sizeable gap between capability and intent is getting smaller and smaller. While the previous gap has given the United States a head start in planning for a disaster, there is strong evidence to suggest that this disparity will one day be overcome. The United States will likely deal with a malicious group which possesses both the ability and the intent to cause a biological disaster. Just because an attack has not happened before, does not mean that one will not occur in the future.

One of the problems that the United States is facing is the comprehensive strategy of dealing with a biological attack. Recently, Mr. Bill Patrick, former chief of U.S.

biological-weapons production, criticized the government's biological-defense spending of billions of dollars on a high-tech sniffing device to be used only by the U.S. Postal Service.[6] The former chief states that the Postal Service is not a good target for a skilled terrorist to consider attacking, as there are not many people in one location to be harmed. This is an example of the U.S. government fighting the "last war" rather than preparing for new ones. Many of the defense institutes are understandably struggling to successfully develop and integrate bioterrorism education, preparedness, and response plans. The average Chemical officer—who ostensibly is responsible for dealing with the nonmedical aspects of a biological contingency—must be prepared to deal with the many possibilities he may face in a biological attack. And civilian authorities and hospitals must be prepared to deal with a massive biological emergency. The response plans and defensive strategies of the United States cannot be vulnerable to an individual or an organization that possesses both the capability and the evil intent.

It stands to reason that as the gap between capability and intent closes, someone will have enough resources and ill will to facilitate an attack on the United States. The question is: How can we improve our defenses and response plans? Current U.S. defensive countermeasures are based around sensors placed in larger cities, stockpiles of drugs, and a handful of traditional vaccines. These measures are essentially fixed defenses against only the well-known biological threats. While these defenses would be effective in counteracting some attacks, Dr. Roger Brent, President of the Molecular Sciences Institute, believes strongly that a large shift in policy and philosophy is needed.[7] He feels that the United States should move away from fixed defenses and toward a systems approach that employs the best tools of the biotechnological revolution. A terrorist group using biological weapons shares certain strategic advantages with all terrorists. Most importantly, it only needs to find one vulnerability to exploit, while the target population must defend against all possible attacks. Dr. Brent suggests that instead of engaging in an unwinnable cycle of defensive preparation against specific biological threats, the United States should build a flexible program "complemented by flexible detections of new threats and agile responses to them." A good example of focusing resources on flexibility is *BioWar*, a city level multiagent simulation developed by Dr. Kathleen M. Carley at Carnegie Mellon University. BioWar allows analysts to evaluate human responses to potential biological and chemical threats and build robust defenses.[8] Yale University maintains a state-of-the-art database that contains "scientific evidence about how animal disease events can be an early warning system for emerging human diseases."[9] Likewise, the University of Louisville received a $22 million federal grant to "develop new vaccines to fight emerging infectious diseases."[10] These programs are welcome steps in the right direction. They underlie the fact that the government must continue to think of new ways to approach the dilemma surrounding the threat of biological terrorism.

These suggestions are fairly general, but they display an important idea: We cannot afford to fight the wars of the past. The ultimate goal is for the United States to one day move away from fixed strategic defenses. It must move toward a more flexible and agile integrated response. This response plan must show the capabilities required to defend against the future threats of advanced biotechnological capabilities. The United States has been fortunate not to have been victimized by a massive biological attack, but we cannot discount the possibility that such an attack could occur. Thus, as members of the Chemical Corps, it is up to us to lead the way and create a broader philosophy about biological defense and biological education.

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[4]ibid.

[5]Rob Carlson, "Splice It Yourself," *Wired* magazine, May 2005, *<http://www.wired.com/wired/archive/13.05/view.html?pg=2>*, accessed on 29 March 2006.

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[8]K.M. Carley et al., "BioWar: Scalable Agent-Based Model of Bioattacks;" IEEE Transactions on Systems, Man and Cybernetics-Part A; Vol. 36(2); 2006; pp. 252-265.

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Major Ian McCulloh and Second Lieutenant Tony Benedosso are assigned to the U.S. Military Academy in the mathematics department. They are both Chemical officers and conduct active research in the area of chemical-biological defense.

Ventilation Systems:

A Terrorist Target of Opportunity or the First Line of Defense?

By Master Sergeant Arthur S. Hughes

Bioterrorism is a national concern. Ways to defeat intentional releases of agents and/or neutralize them are always under investigation. But adapting existing technologies could be as effective—in cost and in mission operation—as the expense, research, and development required for a new defensive system.

Scenario

It is late June, and the temperature is around 80 degrees. The armory on Second Street is being used for a local fundraiser, and the parking lot is about 75 percent full. People are coming and going in the public areas of the compound. There is public access to many cylinders of compressed gas (full and spent), including those used by vendors.

A few cylinders labeled "compressed gas" are located in an area near a building air-return vent, but they do not draw any attention. They have been intentionally mislabeled by a terrorist and actually contain a biological agent. At the appropriate time, the cylinders are opened to unleash a biological agent on the local population.

As the air-handling equipment moves large volumes of air throughout the building, 150 to 200 people are exposed to the agent. Since the symptoms do not appear for a few days, mild cases spread the agent (through contact with infected persons or clothing) to others who were not at the event.

When a terrorist attack occurs at a government establishment, the populace loses faith that the procedures in place will protect them in an emergency situation. Fear in the populace equals a terrorist victory.

To understand how this could happen and how future attacks can be prevented, it is necessary to understand the setup and function of the basic heating, ventilation, and air-conditioning (HVAC) system. The purpose of an HVAC system is to move, recirculate, and refresh large amounts of air in buildings with limited ventilation. The HVAC system was designed to alleviate sick building syndrome but, in recent years, it has become a weapon to combat the Global War on Terrorism.

UVGI Module

HVAC systems condition and recirculate most of the returned air. The remaining air is discharged outside to reduce odors and the level of carbon dioxide in the building. The recirculated air is then mixed with fresh, outside air and sent throughout the building. Since the recirculated air does not always return to the same area it was taken from, the entire building becomes contaminated.

For the most part, air intake units are placed on the roofs of buildings, and mechanical rooms are usually out of public access areas. But the problem is the air-return vents. They are in every room (and it is not uncommon to see several in the same room). Filter units are usually not the high-efficiency, particulate air (HEPA) type. They are usually little better than the standard house filter. This scenario could have been turned around with a few inexpensive precautions added to the filtration system. The use of a HEPA filter in the air-return system significantly reduces the amount of circulating agent. HEPA filters remove 99.9 percent of particulate 0.3 micrometer or larger.

HEPA filter technology was developed over 60 years ago for the Manhattan Project.[1] This technology is still used today to capture pollen, dust, mold, and chemicals suspended in the air. The addition of an ultraviolet, germicidal irradiation (UVGI) system (the next step forward in filtration) would have prevented the spread of contamination even if the HEPA filter failed (possibly because of incorrect fitting or improper or missed maintenance).

UVGI is widely used in the scientific and health care fields. Engineers are mostly familiar with placing UVGIs in laboratories, not in HVAC systems for large buildings. But UVGIs work just the same in small- or large-scale operations and can be a formidable weapon in the biological-defense arsenal.

Ultraviolet, Germicidal Irradiation System

UVGI is produced by mercury vapor lights operating in a range called the *germicidal ultraviolet C (UVC)* bandwidth of the electromagnetic spectrum at the specific wavelength of 253.7 nanometers. Many airborne respiratory agents are susceptible to inactivation by levitating light at this wavelength.

UVGI penetrates the cell membrane of the agent and chemically causes a change to the deoxyribonucleic acid (DNA). This change renders the organism incapable of reproduction. Unable to reproduce, the agent/organism becomes ineffective and incapable of infecting personnel in a building under attack.

The system also produces hydroxyls (a subgroup of the oxide group). Hydroxyls have a charge of minus 1. The chemicals that hydroxyls form are the opposite of acids (also known as caustics or alkalis). Examples are sodium hydroxide and potassium hydroxide. The negative charge causes them to readily combine with other molecules and form new, heavier compounds. These compounds then drop out of the circulating air and into a collection pan for disposal.

The Combined System

Our public buildings are vulnerable to inside attacks by terrorists using air-return systems. Returns are located in every room, and they cannot be constantly guarded or shut down. The circulating air is redistributed throughout the building, making it impossible to isolate one section. Using a combination of HEPA filters, diligent maintenance, and UVGI technology in HVAC systems will reduce the vulnerability for attacks on buildings. And the UVGI system requires very little main-tenance, which encourages greater compliance.

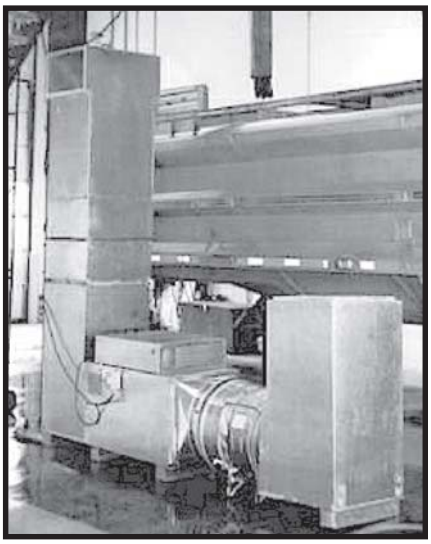
Studies

The British medical journal, *Lancet*, published an article in 2003 which concluded that the installation of UVGI systems in offices in North America could resolve work-related symptoms, caused by microbial organisms found in HVAC systems, in about 4 million employees.[2]

Westside Test and Balance, Incorporated, conducted simultaneous comparative studies on two HVAC air-handling units (AHUs).[3] Both studies showed an increase in the amount of coverage and a decrease in the energy usage. The net result was a more efficient and cost-effective operation. Since these systems are specifically designed for each application, they can be adapted for field use in areas such as collective shelters, field hospitals, and command and control centers.

Conclusion

Open societies, by their very nature, will always be vulnerable to attack by extremists. However, we can take reasonable precautions to limit the outcome of these actions. Upgrading HVAC systems with HEPA filters and UVGI technologies would be the most cost-effective, take the least time to implement, and be the best resource-consuming and effective avenue of approach. Preparedness for a biological attack can save lives, improve the overall health of the work force, save resources, preserve employee sick time, and reduce lost productivity time.



UVGI installed in HVAC system

Endnotes:

[1]The Manhattan Project was the code name for the U.S. government's secret project that was established before World War II and culminated in the development of the nuclear bomb.

[2]D. Menzies et al., "Effect of Ultraviolet Germicidal Lights Installed in Office Ventilation Systems on Workers' Health and Well-Being: Double-Blind Multiple Crossover Trial," *Lancet*, Vol. 362, Issue 9398, 29 November 2003, pp. 1785–1791.

[3]Westside Test and Balance, Incorporated; 7193 Douglas Boulevard; Suite 203; Douglasville, Georgia.

Reference:

Camden County Courier Post, New Jersey.

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The Chemical Corps in 2020:

Using Network-Enabled Operations to Interdict CBRN and TIC Releases

By Major David Bergman

". . . our relevance to the combatant commander requires us to be more than just a reactionary force."

Brigadier General Stanley H. Lillie
Chief of Chemical, August 2003–June 2006[1]

Historically, decontamination has been viewed and used as a defensive measure, normally as part of force protection within the warfighting sphere. With the development and procurement of chemical, biological, radiological, and nuclear (CBRN) sensors, the shift to network-enabled operations (NEO) by the year 2020 and the advances in decontamination solution dispensing from air platforms, decontamination operations can be refined to be used as an offensive tool (in relation to early interdiction). This advancement will be significant to warfighting operations and homeland defense, with the U.S. Army Chemical Corps playing a critical part in the joint initiative.

The Chemical Corps will play a lead role in integrating defensive measures into decontamination operations in a warfighting system. The desired outcome of future decontamination operations must be to interdict CBRN releases. In order for this to occur, the Chemical Corps must use advances in network-centric warfare (NCW), current sensors and programs, and remote delivery systems to forge capability initiatives. "The CBRN defense capabilities we provide are essential to our warfighters in winning the Nation's wars and helping federal, state, and local agencies defend the homeland."[2] This article explores how the Chemical Corps, as the recognized leader in CBRN defense, can develop advanced capabilities for use by joint warfighters and homeland defenders.

Background

In many regions where American, British, Canadian, and Australian (ABCA) countries are likely to operate, an increase in CBRN personal-protective equipment (PPE) levels corresponds with a marked decrease in individual performance to such a degree that a "survive-to-evacuate" policy prevails. This is due to the difficulties of PPE use in equatorial environments with high temperatures or high humidity. To reduce the risk from CBRN and toxic industrial chemicals (TIC)/toxic industrial material (TIM) contamination, ABCA countries are on the cusp of having the ability to use interdiction platforms to reduce the effectiveness of CBRN and TIC/TIM releases.

The current principles of decontamination—perform as soon as possible, use only when necessary, perform as far forward as possible, and apply by priority—are defensive in nature and concede opportunities to the enemy. The enemy carries out an attack, and we respond with defensive operations. The way forward is to take technological advances and shape them to produce a desired outcome. We still need traditional decontamination techniques; however, the need will be reduced due to heightened offensive decontamination capabilities.

Force Structure

Australia, along with fellow ABCA countries, is planning the structure of future defensive forces. All of these countries are moving along similar paths to create new force structures by 2020. In this area, our greatest challenge is keeping up with ever-changing technological improvements. The major reorganization of Chemical units, including the development of multicapable Chemical companies, will enhance the support available to the combatant commander by consolidating functions and simplifying unit structures.

Australia is embracing the future joint operating concept (FJOC), which describes how the Australian Defense Force (ADF) will fight. The NCW is an integrating and supporting concept designed to organize the ADF using modern information technology that links commanders directly to sensoring equipment and weapons systems to allow real-time visibility. NCW is a tool that can contribute significantly to producing a warfighting advantage.[3]

Network-Enabled Operations

NEO forms part of the NCW concept. The Australian document that outlines these plans is *Force 2020*.[4] This document outlines the need to transition from platform-centric operations to NEO. Force 2020 goes on to explain how NEO derives power from effectively linking organizational elements to conduct warfare operations more effectively. The NEO concept treats platforms as "nodes" in a network. Since all elements of the network are securely connected, personnel can collect, share, and access information to create a common, real-time battlespace picture across all components and services. This allows for a greater level of situational awareness, coordination, and offensive potential.

A desired outcome for using NEO is a common and enhanced battlespace awareness that delivers a maximum combat effect. The maximum combat effect for the Chemical Corps is the interdiction of CBRN release plumes to neutralize agent effects. Traditionally, the focus of decontamination operations has been on liquid contamination, but we should be exploring the nontraditional gap areas. One such gap area worth exploring is the aerial release of decontaminants to neutralize vapor clouds.

The NEO concept is a tiered system of grids—sensor, command and control (C2), and engagement—with specific purposes:

- A sensor grid collates real-time information from every type of sensor, from satellites to Soldiers, to create a shared picture of battlefield conditions. The ability to connect to this grid will emerge as the primary source of combat power.
- A C2 grid collates, analyzes, and makes rapid maneuver and target allocation decisions based on the battlefield picture.
- An engagement grid executes the decisions of the C2 grid, using the best "shooter" regardless of the equipment designated to deal with the target.[5]

Sensor Grid

The Chemical Corps should develop the sensor grid as a priority. This does not mean an increase in the number of sensors, but rather an upgrade in their ability to communicate with the C2 grid. Each sensor should have the ability to link into the system as needed. This may mean a "drill down" ability where the main Chemical Corps C2 grid (such as the hazard prediction and assessment capability [HPAC]) automatically processes sensor information as it moves further into an area.[6] The Australian HPAC does this by linking into meteorological sensors around the world. The GID-3™ also has a remote sensing capability that links back to a base station.[7] The Chemical Corps needs unit-based sensors to link into the C2 grid.

Along with the development of unmanned aerial vehicles (UAVs), the Chemical Corps should focus on the development of UAV CBRN sensors. Current UAV development focuses on imagery and striking platforms that fly high and fast. The UAV CBRN sensor platform will fly slow and low. The Corps should be involved with UAV CBRN sensors now, as they will become more critical to future operations.

Doctrine that addresses the employment of sensors in an NEO environment needs to be developed now. It must be linked to the new CBRN doctrinal concept, which is framed in the areas of sense, shape, shield, and sustain. Forward thinking is required for this developing doctrine, which would include sensor sighting, information transfers, decision-making processes within the C2 grid, and the employment of relevant Corps engagement grid resources (such as UAVs, unmanned ground vehicles [UGVs], and air platform-based decontamination assets).

Command and Control Grid

C2 grid networking is broken down into a two-phase response. Phase 1 calls for the incorporation of current warning and reporting systems and the enhanced C2 technology needed to incorporate air platforms into an interdiction plan. Using HPAC as an example, the upgraded system will display the sensor grid information, the current location, and the state-of-readiness status of all chemical engagement grid platforms. Upon receipt of information from the sensor grid, the Chemical officer in the C2 grid plans the immediate plume interdiction and transfers the plan to the respective engagement sensors. These engagement sensors could include C-130 aircraft, UAVs, UGVs, or troops. Phase 2 involves an ongoing assessment of the long- and short-term threats and the identification of ground forces required to go to a higher level of PPE.

This threat assessment is as relevant to homeland defense operations as it is to conventional warfighting operations. Phase 2 also includes the performance of ongoing response requirements.

With the goal of using new technical advances to show the Corps' early interdiction of a CBRN plume, the challenges of conducting successful sensor information transfers to airborne platforms is critical. A Northrop Grumman Corporation/Lockheed Martin Corporation industry group recently demonstrated success in high-bandwidth communication transfer to and from air platforms. "In the demonstration, electronic signals generated by the [active, electronically steered array] AESA radar were used to transmit imagery data transmission to [the] L-3 Communications [Corporation] common data link [CDL] modems, at a speed of 274 megabits-per-second, twice and four times the basic common data CDL data rate. . . . This demonstration is part of the F/A-22 Non-Traditional Intelligence, Surveillance and Reconnaissance (NT-ISR) missions, considered for possible spiral application into F-22 and F-35 aircraft programs, allowing them to transmit and receive large, uncompressed data packages, such as synthetic aperture radar images and other data, within seconds."[8]

The mentioned demonstration is one example of the ground-to-air data transfer capability available. This capability will allow the Chemical Corps C2 grid to transfer the required data to an engagement grid (which in this case is a C-130 aircraft from the 910th Airlift Wing) to interdict a CBRN release. The development and conceptual validity of the information transfer capability between the C2 grid and the 910th Airlift Wing platform should be considered urgent!

A C-130 performs an aerial-spray mission.

The development of a Chemical Corps engagement grid component will diminish the threat through a network of interdiction platforms. "The vital importance of seaports of debarkation (SPODs) to U.S. power projection capability makes them an attractive target for a chemical-biological (CB) attack. . . . As such, SPODs in immature theaters are considered strategic centers of gravity requiring careful protection and commitment of resources to ensure that they are adequately protected and, if attacked, quickly restored to operation. The ability to defend SPODs against CB, toxic industrial chemical[s] (TIC), and toxic industrial material (TIM) attacks is an operational necessity for all unified combatant commands during power projection and force deployment operations."[9]

The development and advances in the sensor and C2 grids provide the opportunity to include force multipliers in the engagement grid. In particular, a main Chemical Corps weapon in the armory to interdict CBRN releases should be the aerial-spray capability of the 910th. Aerial-spray capability has historically been limited to the eradication of pests such as mosquitoes and beetles, but the capability of the 910th to perform wide-area decontamination operations is outside current Chemical Corps engagement grid assets.

The 910th Airlift Wing conducted limited trials in the 80s and 90s. These trials demonstrated the ability to deliver spray decontamination from aircraft.[10] "From 1983 to 1993, the 910th Airlift Wing developed a one-of-a-kind [ultrahigh volume] UHV technique for the C-130 [Modular Aerial-Spray System] MASS to apply 250 [gallons per acre] gallons/acre or more with very little drift. From 1993 to 1997, they also conducted feasibility testing with the Joint Contact Point at Dugway Proving Grounds [*sic*] UT [*sic*] and demonstrated that the MASS in the UHV mode can evenly cover a 60-foot by 4,000-foot assault strip with 250 [gallons per acre] gal/ac [of] water using 2.5 sorties."[11]

An October 1998 field test showed that a mild 1.25 percent bleach mixture delivered by the C-130 MASS UHV technique decontaminated 99.9 percent or more of a biological simulant on concrete and painted metal. In the target area, a 1,000-fold average reduction in bacterial contamination was exceeded.[12] The development of aerial-decontamination interdiction capability is moving to larger aircraft that can be contracted at short notice to augment

capability gaps. There is a need for more research on decontamination solutions and methods, particularly in radiological material.

The Chemical Corps engagement grid should not end with traditional equipment and fixed-wing aircraft. The ability to use rotary-wing aircraft and UAVs to deliver decontamination solution should also be explored. For example, equipping the Schiebel Corporation next-generation CAMCOPTER® S-100 tactical UAV (which has a 50-kilogram payload) with a decontamination dispersal system would allow a CBRN release to be remotely, safely, and quickly interdicted. Civil support teams would benefit from the augmentation of engagement grid resources (such as the 910th Airlift Wing) during periods of heightened threat levels.

Summary

Operations in support of homeland defense operations or the warfighter commander will likely require the earliest interdiction to combat a CBRN release, particularly in an urban environment. The plume modeling studies conducted by various research institutions demonstrate the way a CBRN release will act in an urban environment and with various wind patterns. Future plume modeling should focus on real-time scenarios that address how an agent release will likely move and how we will reduce the effectiveness of that release. The goal should be to reduce the need for troops to increase their PPE posture. Addressing agent releases early will result in threat neutralization or minimization.

Detectors as part of a sensor program will detect the release of CBRN agents. This information will then be sent to the command headquarters and interdiction platforms. This will then allow a release interdiction plan to be developed and implemented, which will activate the employment of fixed, rotary, and UAV platforms. NCW advances enable the transfer of information. A common operating warning and reporting package forms the basis of any response. Fixed and mobile sensors (including UAVs) provide the initial identification and verification notification (reporting the information through the Warning and Reporting System). This information flows to the C2 area and interdiction platforms. At the C2 area, the Chemical officer develops and coordinates the interdiction plan based on the available information. Interdiction platforms such as the 910th Airlift Wing C-130s and Chemical Corps UAVs then implement an interdiction strategy based on the plan. This would see the 910th carrying out decontamination runs from appropriate heights, rotary-wing aircraft performing bulk spot drops, and UAVs conducting hot spot missions. The overall goal is to contain the initial agent release and limit the agent spread.

Warfighters need the Chemical Corps to be more than just a reactionary force. NEO and the tiered system of grids will see the seamless transition from detection to precision engagement in interdicting CBRN or TIC/TIM releases. The transition to the future force will see an increased use of remote technology, particularly in the use of UAVs and UGVs (including miniature and micro systems). The immediate boost will be the introduction of the aerial spray capability in engagement grid resources. Incorporating the 910th Airlift Wing so that the C2 grid can share a real-time picture and control the interdiction of CBRN plumes will form the basis for the Chemical Corps to move to the future more effectively. The interdiction of CBRN or TIC/TIM plumes will contribute to the Corps' relevance to the Warfighter and homeland defense commander and its transition to becoming more than just a reactionary force.

Endnotes:

[1]Chief of Chemical, "Moving our Corps Into the 21st Century," *Army Chemical Revie*w, April 2004, p. 7.

[2]Ibid.

[3]Andrew Hetherington, "NCW–The Future is Here," *Australian Army*, *<http://www.defence.gov.au/news/armynews/editions/1137/Default.htm>*, accessed on 25 July 2006.

[4]"Force 2020," *<http://www.defence.gov.au/publications.cfm>*, accessed on 25 July 2006.

[5]Ibid.

[6]The HPAC is a hazard prediction system with an atmospheric-dispersion model as its core.

[7]The GID-3 is an automatic chemical-agent detector and alarm system manufactured by Smith Detection©. It warns of the presence of chemical-agent vapor in the surrounding air.

[8]"Converting Aircraft for Broadband Data Transfer Capability," *Defense Update, International Online Defense Magazine, <http://www.defense-update.com/features/du-1-06/aircraft-com.htm>*, accessed on 14 July 2006.

[9]Victor Ellis, "Science and Technology in a Dynamic CBRN Landscape," *Army Chemical Review*, April 2004, p. 32.

[10]Youngstown-Warren Air Reserve Station, "Fact Sheets: Aerial Spray Mission," *<http://www.youngstown.afrc.af.mil/library/factsheets/factsheet.asp?id=3413>*, accessed on 14 July 2006.

[11]Headquarters, U.S. Air Force Reserve Command, 910th Airlift Wing briefing notes.

[12]Ibid.

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CHEMICAL WARRIORS IN THE PHILIPPINE CAMPAIGN

By Colonel Robert Walk

In December 1941, the Chemical Warfare Service (CWS) (an early name for the U.S. Army Chemical Corps) was a small part of the Army. Averaging about 80 officers and 700 enlisted men through the interwar years of 1920 to 1940, the CWS exploded to 993 officers and 5,591 enlisted men by December 1941. Of these, 14 officers, 275 enlisted men, and 12 Philippine scouts (divided into two companies) were on the Philippine Islands (a commonwealth of the United States at the time). These men were the first Chemical Soldiers to see combat during World War II.

At the beginning of the war, one of the two companies in the Philippines was the 7th Chemical Company (Aviation). The 7th was formed with personnel from several small Chemical detachments located at Clark, Nichols, and Iba Airfields. Their mission was to support the Philippine Far East Air Force with smoke and chemical warfare material. When the Far East Air Force was eliminated as a formidable fighting force, the 7th was left without a mission. The company then joined the 31st Infantry Regiment and fought as infantrymen on Bataan. The 7th Chemical Company began the war with 3 officers and 185 Soldiers; of these men, 8 were killed in action prior to capture and 62 returned home at the end of the war.

The second company was the 4th Separate Chemical Company (Weapons), a small unit with 2 officers and 64 enlisted men. Since chemical weapons were not available for use in the early stages of the war, the 4th was not assigned a mission. But in February 1942, the 4th Separate Chemical Company was attached to the 31st Infantry Regiment to fight as infantrymen. Only 22 Soldiers from the 4th returned home at the end of the war.

The 301st Chemical Company (Depot) (Philippine Army) was formed in December 1941 with 4 officers and 70 enlisted men. The 301st, along with American units, ran the Bataan and Fort Mills Chemical Depots on Corregidor. They also fought as infantrymen against the invading Japanese Army and died alongside their American comrades. Casualty figures are not available for this Philippine unit, but the figures are likely comparable to U.S. casualties.

During the first Philippine Campaign, Chemical Soldiers performed laboratory services, prepared insecticide-impregnated clothing, repaired chemical warfare equipment, and performed other missions as needed. One of the first and most important missions they undertook was the emergency installation of ventilation equipment for the hospital in the Malinta Tunnel on Corregidor. Without these blowers, life in the tunnel would not have been pleasant for the Soldiers needing to work there. Knowing they needed to support the Soldiers in the field, Chemical personnel converted chemical warfare material into battery acid to enable the continued use of vehicles and chemical decontaminants into water purification material. They even designed a makeshift working flamethrower. In short, Chemical Soldiers supported the Army as best they could, given the means available. At least six Silver Stars were awarded for gallantry to Soldiers from these units. When the surrender of forces in the Philippine Islands was evident, Soldiers destroyed the chemical warfare materiel considered useful to the enemy, including the small stockpile of chemical agents. One can only imagine what the Japanese propagandists would have done if they had captured chemical warfare agents!

On 9 April 1942, the Filipino-American forces on Bataan surrendered. Survivors from these companies were part of the infamous Bataan death march. No one knows how many died on the march or in the early months at the disease-ridden Camp O'Donnell and Cabanatuan prison camps, but thousands of American and Philippine Soldiers paid the ultimate price. Troops at Corregidor

(continued on page 40)

Dragon's Challenge 2006

By Major Veronica Chinn and Master Sergeant Colin Greene

As the morning dawned on the second annual 11th Air Defense Artillery (ADA) Imperial Brigade Dragon's Challenge, Soldiers anxiously awaited the trials ahead. With the awareness of the potential threats that Soldiers could face in the not-too-distant future, the days of "nobody cares" have dissolved. Commanders understand and emphasize that one of the key elements in deterring threat is having Soldiers who are well trained in chemical, biological, radiological, and nuclear (CBRN) defense. This sends a message to potential enemies that the employment of weapons of mass destruction (WMD) against our troops will have little or no effect on operations and mission successes.

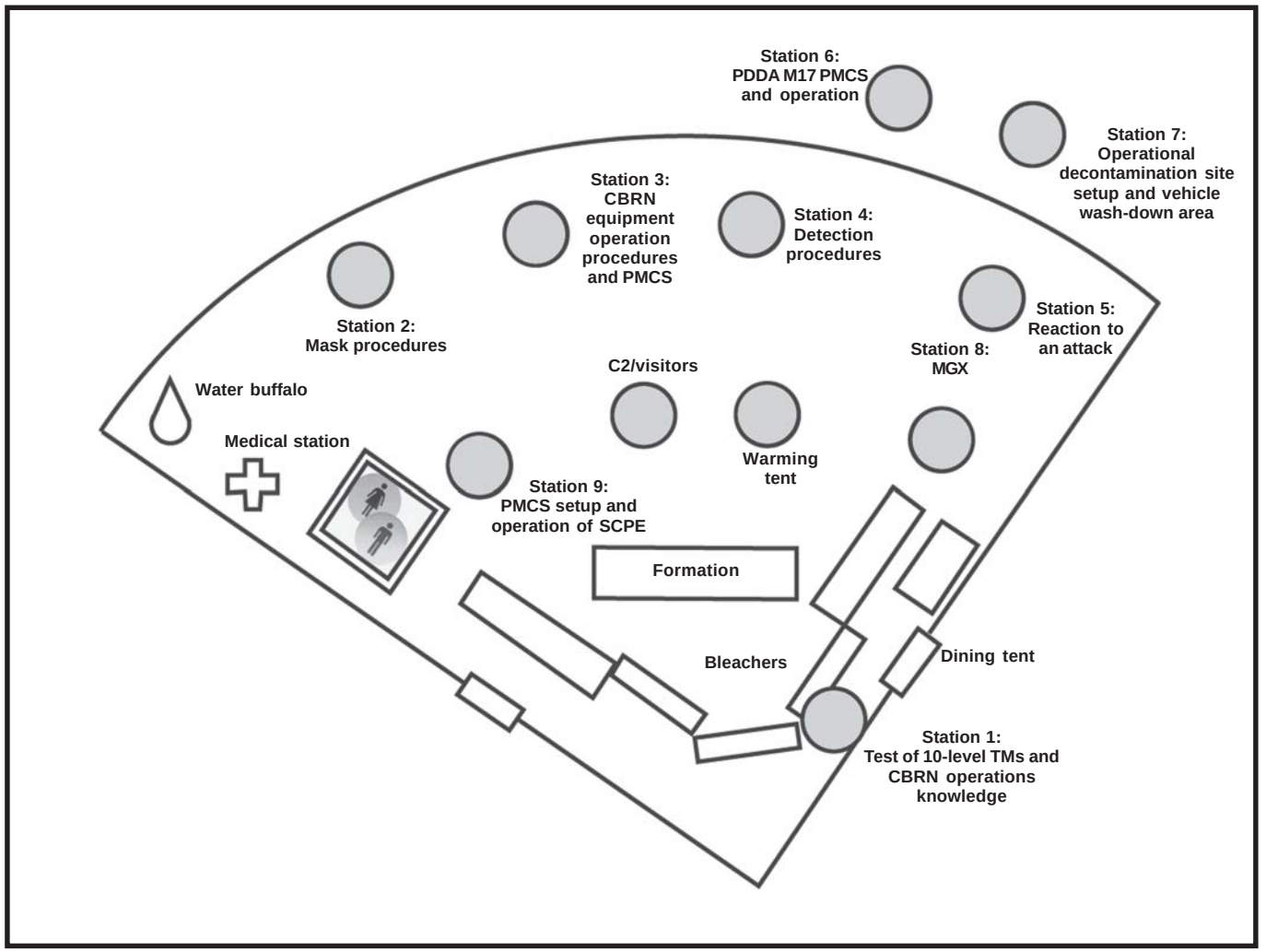
Our Dragon's Challenge competition evolved from the old nuclear, biological, and chemical (NBC) rodeo concept. The NBC concept brings the spirit of fun and competition to tasks that are otherwise grueling and physically demanding. Organized events such as this reinforce skills and allow Soldiers to practice their abilities to complete a mission in a CBRN-contaminated environment.

More than twenty-five Chemical Soldiers in the 11th gathered together six months prior to the Dragon's Challenge to plan an event that would bring their fellow Soldiers together and test their mental and physical stamina and knowledge in all aspects of CBRN training. The three-day event required each battery and separate company in the brigade to create a team of ten Soldiers (for a total of twenty teams). Each team consisted of an officer, a noncommissioned officer, and eight enlisted personnel.

The Stations

The overarching concept for this event was the completion of nine stations. The teams approached the stations in succession and were evaluated on specific CBRN tasks and equipment preventive-maintenance checks and services (PMCS). Each station was worth up to 100 points. The teams had two days to complete all nine stations. The testing field was arranged as shown in the figure on page 18. The stations covered the following tasks:

- **Station 1.** This station contained a multiple-choice test that covered 10-level technical manuals (TMs) and basic CBRN operations knowledge. Each team member took a forty-question test and



The station layout on Fort Bliss' Finney Field

correctly answered as many questions as he could in twenty minutes.

- **Station 2.** This station covered mask maintenance and storage procedures. The primary evaluator at this station randomly selected five members from the team to conduct full PMCS on an M40-series protective mask. They had to correctly identify at least five faults; complete a Department of the Army (DA) Form 5988-E, *Equipment Inspection Maintenance Worksheet*; and answer questions concerning mask maintenance and storage procedures.
- **Station 3.** This station covered the PMCS and operation of the improved chemical-agent monitor (ICAM), AN/VDR-2 radiac set, and M22 automatic chemical-agent detector and alarm (ACADA). For this station, the teams brought three pieces of their own equipment. The evaluator randomly selected several team members to conduct PMCS on one piece of equipment and then put it into operation.

An evaluator checks a Soldier's gear following a MOPP 4 race.

- **Station 4.** This station covered detection procedures using M8 and M9 detector paper and an M256 chemical-agent detector kit. The station evaluator randomly selected Soldiers to identify the types of agents (using detector paper) and selected other Soldiers to correctly put an M256 kit into operation.

Soldiers read the results of an M256 kit.

- **Station 5.** This station covered the procedures for reacting to a CBRN attack. At this station, teams reacted to various forms of warnings—voice ("Gas, gas, gas!"), metal on metal, an M22 alarm, a vehicle horn, and a Soldier showing symptoms of nerve-agent poisoning. After donning the correct mission-oriented protective posture (MOPP) gear, Soldiers correctly recorded information on a CBRN marker.
- **Station 6.** This station covered the PMCS and operation of an M17 lightweight power-driven decontaminating apparatus (PDDA). Teams performed PMCS on the M17 and then put it into operation.
- **Station 7.** This station covered operational decontamination site setup and vehicle wash-down procedures. Team members correctly recited the steps of a site setup, taking into consideration the wind direction, and then correctly recited the techniques to wash down a high-mobility, multipurpose, wheeled vehicle (HMMWV) using an M17.
- **Station 8.** This station covered the procedures for a MOPP gear exchange (MGX). All team members were required to go through the steps using the joint service, lightweight, integrated suit technology (JSLIST).
- **Station 9.** This station covered the PMCS procedures, setup, and operation of M20 simplified collective-protection equipment (SCPE). The setup and operation of the M20 SCPE had to be completed according to TM 3-4240-313-10. Due to high winds, Soldiers were required to only partially fill the room liner package.

Soldiers perfom an M20 SCPE setup.

The Relays

The excitement peaked on Day Three when teams competed in relays. The first-place teams were awarded 100 points; the remaining teams were awarded points in decrements of five.

M16 Relay

The first relay required each team member to run a 20-meter course in MOPP 4 gear and then disassemble an M16 rifle into five major parts—the upper receiver, the lower receiver, the bolt housing group, the charging handle, and the sling. After the evaluator observed that the weapons had been broken down correctly, Soldiers reassembled their rifles and performed function checks. When all team members completed the task, the overall team time was recorded.

M13 Relay

In the M13, decontaminating apparatus, portable (DAP) relay, each team member ran 20 meters in MOPP 4 gear to a disassembled DAP, assembled the DAP, pumped two full streams of water into the apparatus, and ran back to the starting point.

MOPP 4 Race

In the final relay, team members donned their MOPP 4 gear at the cue "Gas, gas, gas!" A timer at the starting point monitored the team to ensure that all members achieved the correct posture within the eight-minute standard. Team members had the option of running to the finish line as soon as they achieved MOPP 4 status or running as a group. However, after the team or a team member crossed the finish line, they put their hands up so that evaluators at the finish line could check for deficiencies and add time for each deficiency found. Time stopped when the last member of the team crossed the finish line.

Soldiers practice with their M13 DAPs.

All teams kept the winning trophy in focus and remained competitive until the very end. Three teams came out on top but, of course, there can only be one champion. The winner—D Battery, 5-52d ADA Battalion—received the first-place trophy, a streamer, and bragging rights until Dragon's Challenge 2007.

Why Do We Do This?

The benefits of organizing and conducting an event like the Dragon's Challenge are numerous. First, in order to brainstorm an event concept and determine what tasks require emphasis, you must gather subject matter experts—all the Chemical Soldiers within the unit, regardless of rank. This is how you get ideas flowing and tap into creativity. You also get to know the Chemical Soldiers in each battery and company. By gathering Chemical Soldiers together, you afford them the opportunity to network and share ideas and suggestions and, ultimately, develop concepts that result in well-trained Soldiers and well-maintained equipment—ready to deploy at any time. And the competitive atmosphere makes for great fun! When you mix these elements, Soldiers remember their training.

D Battery, 5-52d ADA Battalion is awarded first place.

The improvement of training is a continual process that must involve Soldiers at all levels. A commander's involvement and support during all phases of planning and execution are essential to the successful completion of these events. Evaluator rehearsals and equipment coordination are also crucial to the success of an event. After-action reviews following each event capture lessons learned and identify improvements to be made. We plan to make next year's competition more challenging by conducting it in a more tactical location and by incorporating lessons learned from Operation Iraqi Freedom.

Major Chinn is the brigade Chemical officer for the 11th ADA Brigade. She holds a bachelor's degree in environmental biology and management from the University of California at Davis and a master's degree in environmental management from Webster University.

Master Sergeant Greene is the Chemical noncommissioned officer in charge of the 11th ADA Brigade.

Slowed by Snow; Forged by Fire

By Captain Saepyol Choe Warren

Monday morning, 28 November 2005, the Soldiers of the 23d Chemical "Lion" Battalion are plucked from the long Thanksgiving weekend to cross the snowy, rock-sliding Snoqualmie Pass to Yakima for a twelve-day, live-fire exercise (LFX). With the 180-mile stretch across Washington State before them, the convoy sets out into the snowy desert for cold-weather training. "You've got to be able to train in all kinds of terrain and weather," said a private from the 585th Engineer "Roughneck" Company (Pipeline Construction).

This exercise offers leaders an additional training opportunity to prepare Soldiers—an opportunity that will not come around again for another 90 days. Stretching the limits of constraints—manpower, time, and training—is a natural consequence for a Soldier in a nation at war. Such commodities are consistently coveted and thoroughly tested. Over a span of two weeks, the battalion works, trains, and shivers for long hours to meet the commander's intent and training objective: Safely conduct platoon level missions and evaluations, learn and improve systems and techniques, accurately battle track, and redeploy with 100 percent accountability.

No matter the mission—decontaminate an airstrip or a unit with M12s, conduct a resupply patrol with a tank and pump unit, or fire live rounds down range with a convoy of gun trucks—the process, from start to finish, is rigorous and challenging. The observers/controllers (O/Cs) evaluate leader performance from the receipt of the mission, through the execution, to the discussion of lessons learned in the after-action review. Everyone involved carries a burden of responsibility. The platoon leadership (operating on a daily average of four hours of sleep) makes detailed decisions, the Soldiers dutifully carry out orders, the opposing force tests tactics, and the O/Cs assess and coach the team toward proficiency.

Harsh winter weather adds another dimension to training. With packed snow, black ice, changing altitudes, and a brutal windchill, units can spend several hours battling with snow chains. Icy roads slow dismount drills and result in occasional injuries (such as frostnip). Weather-related factors force Soldiers to improvise and adapt missions. The cold slows training, but impressively, has no effect on Soldier morale and momentum.

"I enjoyed the training," shares a private from the 23d Chemical Battalion. "When the cold weather hits you in the morning and you can't move your fingers and toes, it's frustrating, but you've just got to suck it up—it'll make you stronger. After this training, I know what my leaders expect of me. It's about learning what we need to work on and getting better at what we're already good at, so we're strong and there are no weak links."

In addition to running the main effort, a significant portion of the force runs simultaneous staff actions and mission support operations, spanning the gamut of battle tracking, maintenance, logistics, medical support, communications, human resources, dining facility operations, and chaplain services. All of the moving pieces—tactical and support—are pivotal to securing the overall mission success.

These demanding circumstances beg the question: How do Soldiers do it? When unfavorable conditions are unrelenting—in training or in battle—how do Soldiers maintain morale? The resounding answer across the board is "cohesion and balance in leadership." According to the sergeant major of the 23d, "Adversity breeds cohesion." "When you're part of a team, you don't want to let your team down—and that motivates you," expresses a private in the 23d. "I'm only successful if the people on my left and right are successful," echoes a sergeant from the 3d Platoon, 62d Chemical Company.

"Success goes above and beyond the mission," continues the sergeant major. "The welfare of the Soldiers feeds into accomplishing the mission. There has to be that balance. You can't tell Soldiers constantly what they need to do for you, then when it comes time for you to do something for them, say you don't have the time. The key to success is making sure Soldiers understand that their leaders are doing everything they can to take care of them. Motivated Soldiers are responsive to their leadership. We have a tight company because we operate with this mentality."

Amidst harsh conditions, a rigorous schedule, and challenging tasks, leaders are taking care of Soldiers, Soldiers are dedicated to accomplishing a tactical mission, and the service support staff is ensuring that every Soldier and fight are resourced. And through it all, Soldier morale is high due to the sense of accomplishment and cohesion. The week of exercises is recorded to help plan future training events, constructive comments on lessons learned are captured to improve the next iteration, and most importantly, the value of Soldier teamwork is stressed.

An LFX is about more than shooting live rounds. It is about great effort and teamwork making all things possible. It is about making it through the fire—the adversity and the fight—and forging a team.

Captain Warren is a native Korean from Pusan. She previously served as the adjutant for the 23d Chemical Battalion, Fort Lewis, Washington. She is a graduate of the University of Portland.

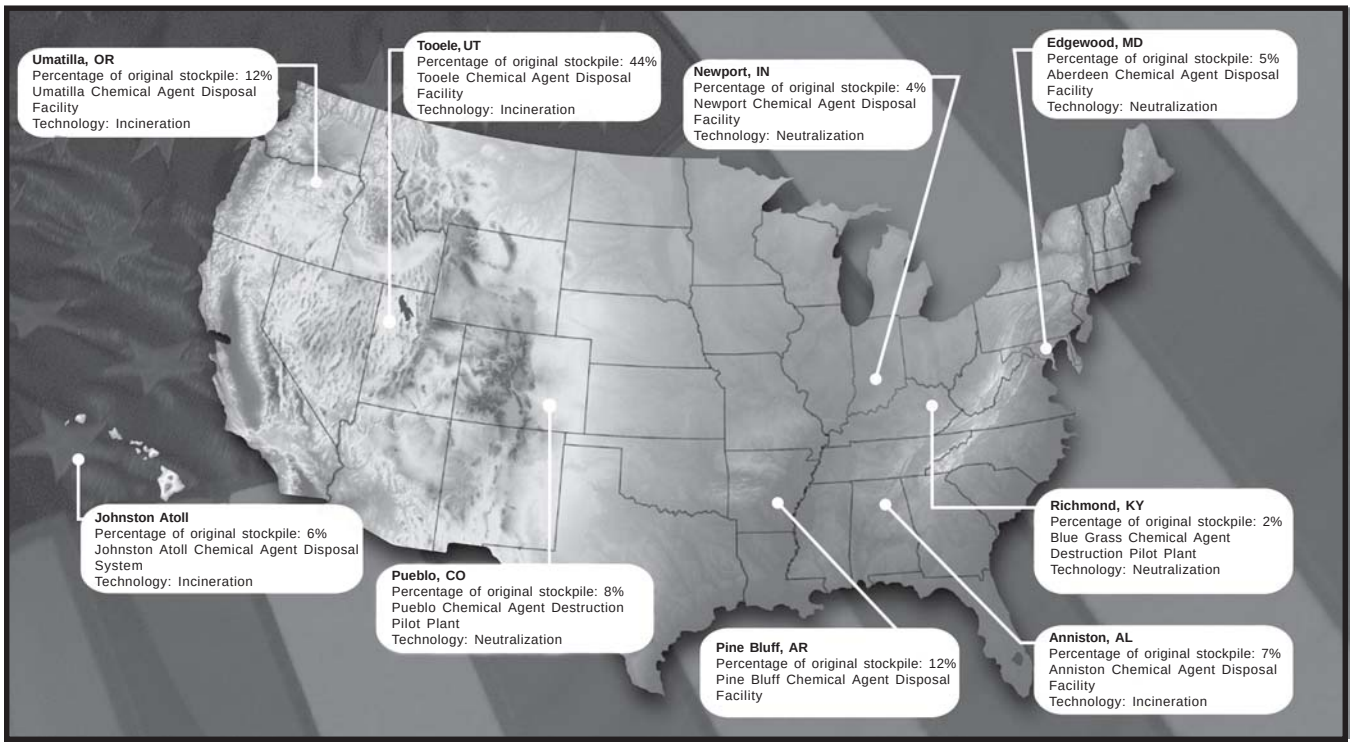
Eliminating the Chemical Stockpile

By Ms. Raini K. Wright

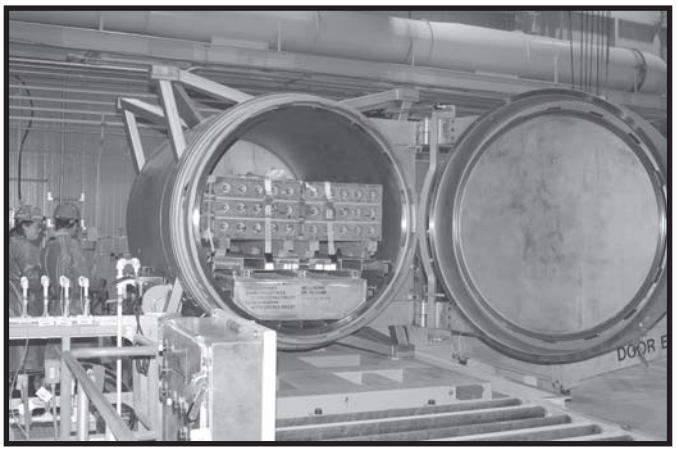
In 1985, the U.S. Congress passed Public Law 99-145, requiring the Department of Defense to dispose of its chemical weapons. As a result, the Army's Program Manager for Chemical Demilitarization was formed with the task of safely eliminating the stockpile. In 1997, the United States signed the International Chemical Weapons Convention (CWC) treaty. This agreement required the United States to destroy its chemical weapons stockpile by the year 2007. A host of other nations have also signed the treaty, which calls for the destruction of all chemical weapons worldwide and prohibits the use, stockpile, or production of chemical weapons.

For decades, the Army has studied numerous technologies used for the destruction of chemical warfare agents. Due to the completeness of the incineration process and its ability to handle all agent types and munitions configurations, incineration was deemed the most proven technology available to safely eliminate the stockpile while ensuring maximum protection of the workers, the community, and the environment. In 1984, the incineration process was also recommended and endorsed by the independent National Research Council (NRC) as the safest process available to destroy the stockpile. In 1994, the NRC conducted a follow-up study and again recommended the incineration process as the safest technology to destroy the stockpile. The incineration process was further reinforced by recommendations from the Centers for Disease Control.

The Pine Bluff Arsenal (PBA) stores about 12 percent of the Nation's original stockpile. The Army began construction of the Pine Bluff Chemical Agent Disposal Facility (PBCDF) in January 1999, following the issue of regulatory permits by the Arkansas Department of Environmental Quality (ADEQ). The permits were issued



U.S. chemical weapons stockpile sites



Interior of an enhanced on-site container

only after the ADEQ thoroughly reviewed the Army's permit application and ensured that the health and safety of the PBCDF workers, the public, and the environment were protected. An appeal of the PBCDF permits was filed in January 1999. The permits were affirmed in May 2000, after an Arkansas Pollution Control and Ecology Commission adjudicatory hearing in September 1999. Further appeals, advanced to the Arkansas State Supreme Court, upheld the permits.

Construction on the PBCDF was completed in November 2002. The site covers 26 acres, with construction encompassing the former quinuclidinyl benzilate (BZ) Destruction Facility. Personnel at PBCDF have invested more than 11 million hours constructing, testing, and training for disposal operations. The testing and training phases were completed in 2005. Operations began in March 2005 and will require a minimum of five years to complete. Closure will begin immediately after operations are completed, with an estimated duration of 2 years. Between 700 and 800 contract workers are expected to be employed at PBCDF during disposal operations.

Eliminating the stockpile involves separating the components of the munitions—liquid agents, explosives, and metal parts—using a controlled and automated system. Each of the components is disposed of in its own incinerator. Each incinerator has its own pollution abatement system, which thoroughly cleans emissions to meet federal and state requirements. To ensure the protection, safety, and health of the workers, the community, and the environment, operations are conducted using strict environmental controls with redundant safeguards.

Pollution Abatement System

For additional information regarding the PBCDF or the Army's Chemical Stockpile Disposal Program, contact the—

Outreach Office for Chemical Disposal
7197 Sheridan Road
Suite 110
White Hall, Arkansas 71602
Telephone: (870) 247-2025 or (870) 534-4901

Ms. Wright is the public affairs officer for the PBCDF. She can be reached at (870) 540-2047.

Stockpiles Safely Eliminated
(As of 24 July 2006)

PBCDF Weekly Totals	Amount
Nerve-agent GB rockets	897
Nerve-agent GB pounds*	16,911

PBCDF Project Totals	Amount
Nerve-agent GB rockets	45,937
Percentage of nerve-agent GB rockets	50.8%
Nerve-agent GB pounds*	479,772
Percentage of total chemical-agent tons	6%

*Includes chemical agents destroyed in the deactivation furnace and the Liquid Incinerator System.

The CB Battlefield Legacy: Understanding the Potential Problem of Clustered CB Weapons

By Mr. Reid Kirby

The millions of pieces of unexploded ordnance (UXO) littering former battlefields are a lingering legacy of World War I. In the Verdun, French *démineurs* dispose of about 30 tons of chemical ordnance each year; they have been doing so since 1945. China, too, has a chemical battlefield legacy, with more than 120 tons of abandoned Japanese chemical weapons from World War II. The removal of these weapons is costly and time-consuming, requiring specialized administrative programs that often operate for decades.

The safety measures, including the temporary evacuation of inhabitants, during removal operations conducted at these weapons sites has resulted in underrating the perceived lethality potential of a contemporary chemical-biological (CB) battlefield. The chemical weapons of World Wars I and II were composed principally of unexploded artillery shells, and they contained agents that were less toxic than the nerve agents of today.

The remnants of a contemporary CB battlefield will include air- and missile-delivered submunitions. Unlike the fragmentation and high-explosive remnants of the Kosovo and Laos conflicts, an accident involving contemporary UXO may affect people far from the immediate vicinity of the accident. A comparison of fragmentation and CB-clustered weapons is important in understanding this potential problem.

Bombs and Warheads

Aerial chemical bombs did not become a part of military inventories until after World War I. The pivotal year for aerial chemical armaments was 1928. In that year, an airpower demonstration conducted by the U.S. Army Air Forces started with an aerial mustard gas spray attack, and the Chemical Warfare Service experimented with 30- and 50-pound aerial bombs. The Italian invasion of Ethiopia in 1935 involved the first large-scale use of aerial chemical weapons, followed by the Japanese in China.

While aerial spray munitions were an important development, the Army Air Corps was biased against using them during World War II. The Germans discovered that chemical cluster bombs were three times more effective than a single, massive chemical bomb. The United States also made this discovery, and chemical cluster bombs—which later included biological cluster bombs—were the accepted standard for CB air armament by the end of the war.

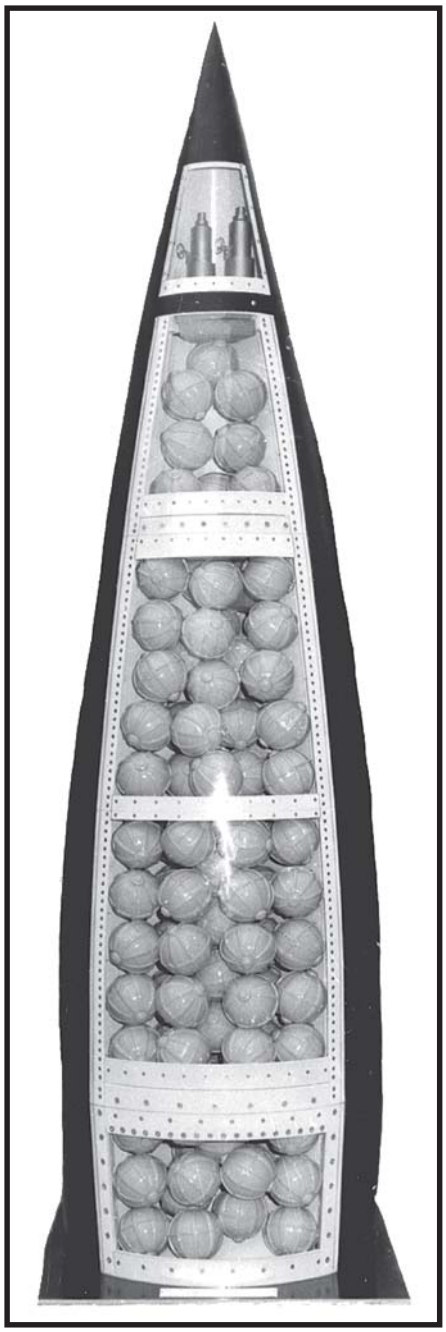
The first air-delivered nerve-agent weapon in the U.S. arsenal was the 1,000-pound M34A1 cluster bomb (originally developed as the E101R3). The M34A1 contained 76 cylindrical, 10-pound M125 (E54R6) chemical bomblets. It had a fill efficiency (ratio of agent weight to weapon weight) of only 17 percent and was, therefore, not an optimum delivery system. It was designed for delivery by medium-size bombers like the B-47, with bombing runs between 15,000 and 35,000 feet above the target. Using an M152E3 mechanical time fuze, the M29 cluster adapter opened at 5,000 feet and was capable of saturating a 170-meter-diameter target with bomblets. The weapon was added to the U.S. chemical inventory as an interim item for an immediate capability, but was retained as augmentation for a period of time following the introduction of more effective sarin (GB) weapons.

Before the advent of ballistic missiles, subsonic cruise missiles were an important part of the U.S. strategic and operational strike capability. The Chemical Corps developed CB warheads for these cruise missiles, incorporating the M125 and M114 bomblets into warheads for the Matador, Rascal, Snark, and Navajo.[1] With the introduction of tactical ballistic missiles, the Chemical Corps began the development of CB warheads for the Major and Hermes; however, these projects were not significant.

Developmental CB warheads for the Corporal missile and an interchangeable warhead for the Honest John free-flight rocket marked a turning point in CB warhead design. Using variations of the M34A1 as warheads, field trials with the Corporal and numerous trials with the Honest John quickly demonstrated problems with traditional clustering. A Chemical Corps review of CB

bomblets in 1954 found that the existing bomblets were unsuitable for coverage requirements (areas greater than 900 feet in diameter), the cluster adapter was redundant, and releases at supersonic speeds resulted in bomblet damage.

The 762-millimeter M190 Honest John GB warhead is an example of a CB warhead used for theater ballistic missiles and large-caliber rockets. Developed as the E19R2, it carried 356 115-millimeter M134 (E130R1) spherical bomblets.[2] The overall fill efficiency of the M190 was 37 percent. It had a range of 8.5 to 33.8 kilometers and released its bomblets at 5,000 feet above its target using a T2075 mechanical time fuze to cut the warhead skin and saturate a target greater than 1,000 meters in diameter with bomblets. The M139 (E130R2) had replaced the M134 by the time the warhead entered production. The M139 had superior coverage, with a glide angle of 22 degrees from vertical.[3]



M190 Honest John GB warhead

Probability

The probability of neutralizing a target with CB weapons in a given situation *(P_S)* is equal to the product of probabilities for the chain of events encountered by almost any weapons system. That is—

$$P_S = P_D \times P_A \times P_L \times P_R \times P_K$$

Where—

P_D = *probability of detecting the target*

P_A = *probability of acquiring the target*

P_L = *probability of launching the CB weapon at the target*

P_R = *probability of the weapon reaching the target*

P_K = *probability of a CB casualty effect.*[4]

Though generic, the importance of the overall probability cannot be underestimated. The equation specifies the steps for defeating a CB capability and indicates the likely success of CB employment. The concealment of our forces and the destruction of enemy intelligence assets lower the probability of detection. Our counter-intelligence and mobility alter the targeting process and lower the probability that an enemy will be able to acquire a target. The destruction of enemy communications networks and/or launchers lowers the probability of launching. Our jamming and intercepting capabilities lower the probability of CB weapons reaching targets. Our detectors, alarms, and CB protective means lower the probability of a casualty effect.

M139 Bomblet

The CB casualty effect is related to the dosage delivered to the target. It depends on the functional qualities of the CB weapon (agent, delivery, dissemination), the protective action of the target, and the environmental conditions (terrain, weather). Dosage refers to an amount of agent received when inhaled or absorbed through the skin; it is associated with a cumulative probability of casualty production. For chemical agents and toxins, which rely on combined effects, the dose response is estimated by a probit analysis. The dose response of biological organisms capable of reproduction is estimated by introducing an exponential probability of infection. Lowering the dosage delivered (masking) lowers the probability of casualties. Likewise, vaccination and prophylactic therapeutics increase the median casualty dosage, thereby also lowering the probability of casualties.

Coverage

The mean area effect (MAE) of a weapon is the area expected to suffer 50 percent casualties or damage.[5] The MAE is a useful tool for comparing different weapons systems. If the dosage over a target is uniform, the MAE is the area covered by the median casualty dosage.[6]

For comparison, during periods of neutral atmospheric stability (Pasquill-Gifford stability Class D) over open, level terrain or on an urban target, the MAE for a 500-pound cluster bomb containing 200 fragmentation bomblets is about half a hectare. Under similar conditions, but with a biological variant in which each bomblet delivers 1×10^8 median infective doses for an agent with an aerobiological decay rate of 5 percent per minute, the MAE is about 11.4 square kilometers. The MAE for the M34A1 is about 3 hectares and for the M190, approximately 0.9 square kilometer.

The elasticity of CB weapons to terrain and meteorological conditions is what distinguishes the MAE of a CB cluster weapon from that of a fragmentation cluster bomb. Over a jungle, a biological cluster bomb may have an MAE of 4.8 square kilometers, while the same bomb may have an MAE of 38.8 square kilometers over open terrain under stable atmospheric conditions. The coverage area of a fragmentation cluster bomb is relatively unaltered, regardless of these factors.[7]

In the early 1950s, a medium-size bomber was capable of attacking 30 square miles with a biological cluster bomb. By the late 1950s, with the introduction of self-dispersing bomblets, the area had increased to 100 square miles. These spherical bomblets, subject to the Magnus lift effect, spread laterally from the point of release to cover significantly larger areas than did traditional cylindrical bomblets, such as the M125. The greater the glide angle of the bomblet, the greater the area covered. By the 1960s, with the Flettner rotar biological bomblet (which has a glide angle of about 44 degrees), it was possible for a single B-52 bomber, with its Hayes dispenser, to cover an area approaching 20,000 square kilometers in size.

Duds and Blinds

In the United States, a munition that fails to function (explode) is called a "dud;" and in Europe, it is called a "blind." There is a difference between the engineered failure rate for weapons and the actual number of duds or blinds experienced on the battlefield. Rough terrain, vegetation, soft soil, mud, and snow contribute to the number of failures experienced. In addition, a bomblet that strikes the ground at an incorrect angle may also fail to detonate.

Different weapons pose different failure rates. In general, 2 percent of artillery rounds and 5 percent of bomblets fail to function. However, experience in the Vietnam and Gulf Wars indicated an actual failure rate of 20 to 30 percent. For example, the MK20 Rockeye, used in the Gulf Wars, had a poor reputation, with 30 to 40 percent of its submunitions failing.[8] In addition, though the stated functional efficiency of the M34A1 was 90 percent and the M190 was 95 percent, in actual testing over level, arid terrain, the rates dropped to 75 and 90 percent, respectively.

If a target in a future conflict is subjected to a strike by a weapon with a failure rate similar to the M34A1, about 19 unexploded GB bomblets could hypothetically be expected over a 2.3-hectare area. If the failure rate of the warhead used is similar to the M190, 35 unexploded bomblets could be expected over an 80-hectare area. About half of these unexploded weapons would be armed. Consequently, there is significant potential for a future incident involving UXO.

Given that a fragmentation bomblet is lethal over a 30-meter radius, the area at risk upon accidental detonation is 0.3 hectare per bomblet.[9] Under neutral atmospheric stability, the area covered by more than a 5 milligram-minute/cubic meter (mg-min/m^3) dosage (negligible risk) of agent GB is about 0.5 hectare for each bomblet. Under stable atmospheric conditions, the area increases to around 1.5 hectares.[10] In other words, GB bomblets have up to five times the casualty potential of fragmentation bomblets.

Risks

The probability that a person crossing an area previously struck by a clustered weapon will encounter an unexploded bomblet *(P_E)* is—

$$P_E = 1 - \left(1 - \frac{L \times d}{A}\right)^B$$

The distance traversed *(L)* into the area *(A)* containing a randomly distributed number of blinds *(B)* is influenced by the diameter of the potential impact *(d)*.[11] When crossing straight through the center of an M34A1 or M190 impact area, a person has a 1 to 3 percent chance of coming in contact with UXO. Half of these bomblets may function on contact, leading to a fratricide event, with agent GB extending 0.5 to 1.5 hectares downwind.

From an epidemiological approach, the individual risk from UXO *(K)* is:

$$K = \frac{C \times A}{P \times B}$$

Dividing the number of casualties per incident *(C)* and the area affected *(A)* by the product of the population *(P)* and amount of UXO *(B)* yields the rate of casualties per month per population density and incident.

Only recently have statistics been used to measure the risks associated with UXO—the best examples of which are from Kosovo and Laos. These statistics reflect the problem and assist in the global management of the issue but are not of use prior to a conflict.[12]

The application of individual risk to unexploded CB weapons is problematic. Explosive ordnance is generally accompanied by a circular area of risk with a decided fraction of casualties and fatalities. CB weapons, however, are accompanied by areas of risk that are irregularly shaped—extending windward from the point of impact. The difference in the number of casualties and fatalities depends on dosage, which with atmospheric diffusion and dosage response variables, normally results in a greater number of casualties than fatalities. Many CB agents (such as BZ) are not lethal and do not result in debilitating wounds.

Mitigation

The storage stability of some of the agents present in unexploded CB weapons is high. Unstabilized nerve agents and binary agents have decay rates as high as 5 to 8 percent per month, greatly reducing the potential for loss of life with time. Many chemical agents are stable for decades—if not centuries. Under ambient conditions, anthrax has a half-life of 3 to 5 years. Vegetative biological agents have half-lives measured in weeks. This stability was illustrated on 29 November 1995, when a construction crew unearthed M114 bomblets at Wright-Patterson Air Force Base, Ohio. These bomblets were the remnants of early 1950s operational testing for an immediate biological capability with brucellosis (agents AB and US). Following years of abandonment, the agent had been completely inactivated, and there was no major human health concern.[13]

Deliberately lowering the risk associated with unexploded CB weapons starts with weapon design. One approach is the use of self-destructing fuzes. This concept was incorporated into the delayed action dissemination technique (DADT) fuzing of the Flettner rotor bomblet toward the end of the U.S. biological program. The internal fuze initiated the gas expulsion system of the bomblet in the event that tampering or a specific temperature, humidity, or lighting condition was detected. The fuze also self-destructed at a specific time (under three days) through the use of a variable delay battery relay. A problem with such fuzing is the increased cost. For example, the M223 fuzes on many fragmentation bomblets are priced at 27 cents each. Replacing these fuzes with self-destructing ones increases the cost to $2.31 each. The decision to include self-destructing design features will depend largely on the possibility of future enemy occupation.

Programs for the clearance of traditional UXO may have rates of removal on the order of 200 to 300 ordnance pieces per month, at a cost of $1,500 per item. With the presence of CB weapons, removal management becomes more complicated; therefore, the rate of removal can be expected to drop significantly. An incident that clearly demonstrates this point recently occurred at Rocky Mountain Arsenal. When an M139 bomblet was discovered in a scrap yard, officials planned to destroy it in place using 5 pounds of high explosives. The explosives were not only to destroy the bomblet, but also to incinerate the GB agent content. The entire effort was to take two weeks and cost $25,000. Instead, after eight months, disposal experts finally built a protective enclosure around the bomblet and removed it for detonation in a containment vessel at a cost of $8.5 million. If this is the level of effort that will be needed to clear future CB battlefields, then such battlefields will likely remain uninhabited, without any attempt to reclaim the land.[14]

Endnotes:

[1]The M114 was the biological bomblet used in the M33 cluster bomb, an improved version of the 4-pound World War II bomblet the British developed for use with anthrax. The M33 was an interim item providing biological capability with agents AB and US.

[2]The M79 (E19R1) preceded the M190. This earlier warhead was developed for the M31A1C version of the Honest John, which was phased out for the XM50 version. The Honest John never entered production.

[3]Sherman L. Davis, *GB Warheads for Army Ballistic Missiles: 1950–1966*, Historical Monograph AMC 51M, U.S. Army Materiel Command, Edgewood Arsenal, Maryland, July 1968.

[4]There are various probability models with regard to an attack. This version was derived by the author after considering the approaches of Lieutenant Colonel William T. McLarty, Jr. ("Technology Implications: The Need for Change," *Military Review*, January 1983, pp. 47–57) and James N. Constant (*Fundamentals of Strategic Weapons: Offense and Defense Systems*, 1981).

[5]John H. Arnold, *Air Armament Planning and Design Through Systems Analysis*, AFATL-TR-72-28, Air Force Armament Laboratory, Eglin Air Force Base, Florida, February 1972 [AD894091]. A problem with this approach is the lack of consistency in the conditional parameter, which provides a rough estimate, at best, when compared to field trial data.

[6]Using a Newton-Cotes type integration on data from various field trials in which half the area has been covered by the median casualty dosage for agent GB demonstrates that this is a reasonable estimate, plus or minus 10 percent.

[7]The MAEs for this hypothetical biological cluster bomb are derived from figures in Field Manual (FM) 3-10, *Chemical and Biological Weapons Employment* (now obsolete), 1962.

[8]Lieutenant Colonel Gary W. Wright, "Scatterable Munitions= Unexploded Ordnance (UXO)=Fratricide," U.S. Army War College, Carlisle Barracks, Pennsylvania, March 1993 [ADA264233].

[9]General Sir Hugh Beach, "Cluster Bombs: The Case for New Controls," Briefing Paper Number 25, International Security Information Service, Brussels, Belgium, May 2001.

[10]Estimates for the M34A1 and M190 were made from field trial data contained in *Joint CB Technical Data Source Book, Volume III, Sub-Volume 3* (Appendices, G Nerve Agents, Part 2: Agent GB), U.S. Army Dugway Proving Ground, Utah, December 1976 [ADB019437L].

[11]*Naval Operations Analysis*, U.S. Naval Academy, 1968, p. 208.

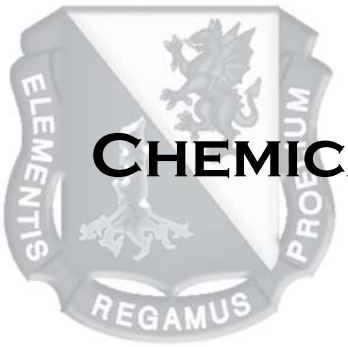
[12]"Explosive Remnants of War (ERW)—A Threat Analysis," Geneva International Centre for Humanitarian Demining, Geneva, Switzerland, 2002.

[13]"Bomblets Contain Brucella Bacteria," United Press International, 8 December 1995.

[14]Albert J. Mauroni, *Chemical Demilitarization: Public Policy Aspects*, Praeger Publishers, April 2003.

Mr. Kirby is a project manager for Strategic Staffing Solutions (S3). He holds a bachelor's degree in valuation science from Lindenwood College, with a minor in biology and special studies in behavioral toxicology and biotechnology.

The 86th Chemical Mortar Battalion will hold its 2007 reunion at Fort Leonard Wood, Missouri, 11–15 April. For additional information, contact George Murray by telephone at (256) 820-4415, or look for details in the next Lobster newsletter.



Chemical School Receives Full Accreditation

By Mr. Robert Johnson

Like a schoolboy waiting for his report card, the U.S. Army Chemical School breathed a sigh of relief as it received full accreditation from the U.S. Army Training and Doctrine Command (TRADOC) on 29 March 2006. The U.S. Army Military Police School, also located at Fort Leonard Wood, Missouri, received full accreditation as well.

According to Bob Wilhelm, an evaluator at the Maneuver Support Center (MANSCEN) Quality Assurance Office, standards in training, training support, and proponent functions were measured during the accreditation process. "This is a really big deal for both schools and, yes, it is like a report card," Wilhelm said. "Both schools had to achieve an 80 percent or better [score] across all 24 standards to receive the full accreditation standing. If the schools had met every standard at 100 percent, they would have been listed as an Institute of Excellence, but nobody in TRADOC is going to see that level this year. There are too many issues, such as funding, that are beyond the gates of Fort Leonard Wood that would influence that level of rating. In today's tight budgets, full accreditation is a high achievement," Wilhelm said. "The process starts with a self-assessment, which is a serious look at yourself and how you are training, then TRADOC provides an assistance visit to help the school meet areas where there are shortfalls or deficiencies . . . ." Wilhelm said.

The Chemical and Military Police Schools join the U.S. Army Engineer School (USAES) and the MANSCEN Noncommissioned Officer Academy (NCOA) (both based at Fort Leonard Wood) in their accreditation award status. The USAES and the NCOA received their ratings in July 2004.

Mr. Johnson is the managing editor for the Fort Leonard Wood Guidon.

DOCTRINE UPDATE

U.S. Army Chemical School
Directorate of Training and Training Development
Doctrine Development Division

Publication Number	Title	Date	Description
Current Publications			
FM 3-11 MCWP 3-37.1 NWP 3-11 AFTTP(I) 3-2.42	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Defense Operations	10 Mar 03	A multiservice tactics, techniques, and procedures (MTTP) manual which provides commanders and staffs a key reference for the planning and execution of service chemical, biological, radiological, and nuclear (CBRN) defense operations, with focus on the passive-defense component of counterproliferation. **Status**: Under review FY 06.
FM 3-11.3 MCRP 3-37.2A NTTP 3-11.25 AFTTP (I) 3-2.56	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Contamination Avoidance	2 Feb 06	An MTTP manual for conducting CBRN contamination avoidance. This revision rescinds Field Manual (FM) 3-3 and FM 3-3-1. **Status**: Current.
FM 3-11.4 MCWP 3-37.2 NTTP 3-11.27 AFTTP(I) 3-2.46	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection	2 Jun 03	An MTTP manual which establishes principles for CBRN protection and addresses individual and collective protection (COLPRO) considerations for the protection of the force and civilian personnel. **Status**: Current.
FM 3-11.5 MCWP 3-37.3 ATTP 3-1.26 AFTTP (I) 3-2.60	Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination	4 Apr 06	An MTTP manual which addresses the principles and levels of CBRN decontamination operations in a tactical environment. **Status**: Current.
FM 3-6 AFM 105-7 FMFM 7-11-H	Field Behavior of NBC Agents (Including Smoke and Incendiaries)	3 Nov 86	An MTTP manual which addresses the battlefield influences of weather and terrain and the use of smoke and obscurants on CBRN operations. **Status**: Under review FY 06.
FM 3-11.9 MCRP 3-37.1B NTRP 3-11.32 AFTTP(I) 3-2.55	Potential Military Chemical/ Biological Agents and Compounds	10 Jan 05	An MTTP manual which provides commanders and staffs with general information and technical data concerning chemical-biological (CB) agents and other compounds of military interest, such as toxic industrial chemicals (TICs). **Status**: Current.
FM 3-11.11 MCRP 3-3.7.2	Flame, Riot Control Agent, and Herbicide Operations	19 Aug 96 C1 10 Mar 03	An MTTP manual which describes the doctrine and tactics, techniques, and procedures (TTP) for employing flame weapons, riot control agents (RCAs), and herbicides during peacetime and combat. **Status**: Current.
FM 3-11.14 MCRP 3-37.1A NTTP 3-11.28 AFTTP(I) 3-2.54	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Vulnerability Assessment	2 Jun 03	An MTTP manual for conducting CBRN vulnerability assessments; analyzing, managing, and assessing risks; and measuring, mitigating, and reducing vulnerabilities. **Status**: Current.
FM 3-11.19 MCWP 3-37.4 NTTP 3-11.29 AFTTP(I) 3-2.44	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Reconnaissance	30 Jul 04	An MTTP manual for planning and conducting CBRN reconnaissance operations to detect, define, limit, mark, sample, and identify CBRN and toxic industrial material (TIM) contamination. **Status**: Current.

NOTE: Current CBRN publications can be accessed and downloaded in electronic format from the Reimer Digital Library at <*http://www.adtdl.army.mil/*> or at the USACMLS Doctrine Web site at <*http://www.wood.army.mil/cmdoc/index.htm*>.

DOCTRINE UPDATE

U.S. Army Chemical School
Directorate of Training and Training Development
Doctrine Development Division

Publication Number	Title	Date	Description
Current Publications (Continued)			
FM 3-11.21 MCRP 3-37.2C NTTP 3-11.24 AFTTP(I) 3-2.37	Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Aspects of Consequence Management	12 Dec 01	An MTTP manual which provides commanders and staffs a key reference for mitigating the CBRN aspects of consequence management. **Status**: Under revision FY 06.
FM 3-11.22	Weapons of Mass Destruction–Civil Support Team Tactics, Techniques, and Procedures	6 Jun 03	An Army-only manual which provides the suggested doctrinal TTP for use by Weapons of Mass Destruction–Civil Support Teams (WMD–CSTs), which are designed to provide support to local, state, and federal response systems. **Status**: Under revision FY 06.
FM 3-11.34 MCWP 3-37.5 NTTP 3-11.23 AFTTP(I) 3-2.33	Multiservice Procedures for Nuclear, Biological, and Chemical (NBC) Defense of Theater Fixed Sites, Ports, and Airfields	2 Aug 00	An MTTP manual which provides multiservice reference for planning, resourcing, and executing CBRN defense of theater fixed sites, ports, and airfields. **Status**: Under revision FY 06.
FM 3-50 (FM 3-11.50)	Smoke Operations	4 Dec 90 C1 11 Sep 96	An Army-only manual which provides the suggested doctrinal TTP to use smoke and obscurants to attack and defeat specific enemy targets, sensors, target acquisition systems, weapon guidance systems, and other enemy electro-optical devices. **Status**: Under review FY 06.
FM 3-11.86 MCWP 3.37.1C NTTP 3-11.31 AFTTP(I) 3-2.52	Multiservice Tactics, Techniques, and Procedures for Biological Surveillance	4 Oct 04	An MTTP manual for planning and conducting biological surveillance operations to monitor, detect, sample, identify, report, package, and evacuate samples of biological warfare agents. **Status**: Current.
FM 3-101 (FM 3-11.100)	Chemical Staffs and Units	19 Nov 93	An Army-only manual which provides fundamental principles for chemical staff functions, command and control of Chemical units, and Chemical unit employment. **Status**: Under revision FY 06.
FM 9-20 (FM 3-11.20)	Technical Escort Operations	3 Nov 97	An Army-only manual which provides the suggested doctrinal TTP for the employment of technical escort battalions. **Status**: Under revision FY 06 (will be renumbered [FM 3-11.20]).

NOTE: Current CBRN publications can be accessed and downloaded in electronic format from the Reimer Digital Library at <*http://www.adtdl.army.mil/*> or at the USACMLS Doctrine Web site at <*http://www.wood.army.mil/cmdoc/index.htm*>.

Emerging Publications

FM 3-11.23	Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE) Handbook for Installation Commanders	To be determined	An Army-only manual for installation personnel to plan for and respond to a terrorist CBRNE attack or incident against an Army facility. **Status**: Under development FY 06.
FM 3-11.24	Chemical, Biological, Radiological, and Nuclear (CBRN) Handbook for Sensitive-Site and Hazardous-Site Assessment Operations	To be determined	An Army-only manual which provides the suggested doctrinal TTP for the conduct of sensitive-site and hazardous-site assessments by conventional Army Chemical units. **Status**: Under development FY 06.

NOTE: To access CBRN draft publications, contact the Chief of Doctrine Development Division at <*ATSNCMDD@wood.army.mil*> to request access instructions.

2006 U.S. Army Chemical Corps Hall of Fame Inductees

Compiled by Kimberly S. Whitacre and Captain Ricardo Jones

The Chemical Corps Hall of Fame award is the highest form of recognition that the Regiment offers. This coveted award honors those who have made a legacy of landmark contributions and significant actions to the overall history and traditions of the Chemical Corps. These individuals have distinguished themselves through superior achievements in the advancement of science, demonstrated great gallantry in battle, or given their lives in combat while serving the Corps. The following Dragon Soldiers were inducted into the 2006 Chemical Corps Hall of Fame: Brigadier General James H. Batte (Retired), Colonel Julian G. Brunt (Retired), Colonel Stanley Fair (Retired), and First Lieutenant Joseph Terry.

Brigadier General James H. Batte (Retired)

Brigadier General Batte was born in Concord, North Carolina, in 1913. He graduated from Davidson College with a bachelor's degree in chemistry before being commissioned as a second lieutenant and selected to attend the U.S. Military Academy. Brigadier General Batte entered the Active Army in July 1935 at Edgewood Arsenal, Maryland, where he served as a company officer in the 2d Chemical Mortar Battalion. In 1940, he was assigned to the Office of the Chief, Chemical Corps, Washington, D.C., where he served as Chief of the Procurement Division. He also served concurrently as a White House aide during the Franklin D. Roosevelt administration.

After completing training at the Command and General Staff School, Brigadier General Batte was assigned to Fort Rucker, Alabama, where he commanded the newly activated 87th Chemical Mortar Battalion. In March 1944, the 87th headed for Europe, where it later participated in assault operations during H-hour on D-day. During D-day operations, the 87th provided primary close-in fire support for 36 hours (earning a Presidential Unit Citation). During his tenure as the commander for the 87th, Brigadier General Batte participated in five campaigns in the European theater.

After World War II, Brigadier General Batte was assigned to the War Department. From December 1945 through June 1948, he served as the executive aide to the Secretary of the Army. He also served concurrently as a senior White House aide in the Truman administration. During the Korean War, Brigadier General Batte served as the Executive Officer of the Chemical and Radiological Laboratories at Edgewood Arsenal and later became the Commander of the Procurement Agency. Following several more assignments at Edgewood Arsenal, Brigadier General Batte returned to Washington to serve as the Special Assistant for Congressional Affairs to the Commanding General of the U.S. Army Materiel Command. In August 1965, Brigadier General Batte was assigned command of Edgewood Arsenal, which also included Pine Bluff Arsenal, Arkansas; Rocky Mountain Arsenal, Colorado; and Fort Detrick, Maryland.

Brigadier General Batte's decorations and awards include the Silver Star, the Legion of Merit (one oak-leaf cluster), the Commendation Ribbon with Metal Pendant, the Purple Heart, the American Campaign Medal, the Asiatic-Pacific Campaign Medal, and the European Theater Campaign Medal (five battle stars and the Invasion Arrowhead). We honor Brigadier General James H. Batte with his induction into the Chemical Corps Hall of Fame.

Colonel Julian G. Brunt (Retired)

Colonel Brunt was born in 1920 near the town of Tutwiler, Mississippi. He attended junior college briefly before enlisting in the Army. After completing basic training at Camp Shelby, Mississippi, the then Sergeant Brunt remained to help train new Soldiers. Later, he was assigned to the 87th Chemical Mortar Battalion, where he participated in the D-day invasion. The 87th served in the most active areas and earned numerous campaign ribbons. In June 1944, Sergeant Brunt received information that his mortar platoon was needed to help combat enemy strongpoints. He quickly deployed his platoon to a firing position and, within an hour and a half, delivered approximately 300 rounds of ammunition into the target area. This action succeeded in demoralizing the enemy, causing them to abandon their positions. Sergeant Brunt's actions on that day earned him a battlefield commission and a Bronze Star. In

November 1944, he earned a Silver Star for gallantry in action when his unit was attacked by a barrage of mortars. When he discovered that one of his Soldiers was wounded, rather than ordering a medical technician to provide aid, he personally treated and evacuated the casualty.

Colonel Brunt went on to serve in various command positions throughout his career, including Chief of the Logistics (G-4) Division, U.S. Army Pacific (USARPAC); Commander of Support Activities (Germany); and Commandant of the U.S. Army Chemical School (1964).

Colonel Brunt retired to his native state of Mississippi in 1977. His decorations and awards include the Silver Star, the Bronze Star, the Purple Heart, the Distinguished Unit Citation, the European Theater Campaign Medal (five battle stars and the Invasion Arrowhead), the World War II Victory Medal, the Army of Occupation Medal, and the National Defense Service Medal. For his excellence in combat and a lifetime of dedicated service to the Army and the Chemical Corps, we honor Colonel Julian Brunt with induction into the Chemical Corps Hall of Fame.

Colonel Stanley Fair (Retired)

Colonel Fair was born and raised in Delphos, Ohio. In 1943, he was appointed to the U.S. Military Academy where he was later commissioned as a second lieutenant in the Sea Coast Artillery. During his time in the Sea Coast Artillery, he commanded a cannon company and was the Intelligence Staff Officer (S-2) of the 65th Antiaircraft Artillery Gun Battalion. In 1951, Colonel Fair attended the U.S. Navy Postgraduate School, where he earned a master's degree in radiobiology. After attending the Command and General Staff College, Colonel Fair went on to hold positions in the Office of the Chief for Research and Development, the Advanced Research Projects Agency, and the Combat Development Center (where he was instrumental in reviewing the Army nuclear policy).

In 1966, after completing his studies at the Army War College, Colonel Fair was assigned as the chemical, biological, and radiological standardization representative in Ottawa, Canada. In 1968, he served at the Combat Development Command Institute of Advanced Studies at Carlisle Barracks, Pennsylvania, where he chaired several nuclear study programs. As Commandant of the Chemical Corps School from 1971 to 1972, Colonel Fair helped revise the curriculum standards. He later returned to Carlisle Barracks to serve as a strategic research analyst and the Deputy Director of the Strategic Studies Institute. Colonel Fair became a recognized authority on chemical and nuclear warfare and authored numerous articles for military journals. Colonel Fair's awards and decorations include the Legion of Merit (two oak-leaf clusters), the Bronze Star, the Meritorious Service Medal, the Army Commendation Medal, the Office of the Secretary of Defense Identification Badge, and the General Staff Identification Badge. For his distinguished service, we honor Colonel Stanley Fair with induction into the Chemical Corps Hall of Fame.

First Lieutenant Joseph Terry

First Lieutenant Terry was born in East Liberty, Pennsylvania, in 1917. Even though he had to cut his formal education short to help support his family, he distinguished himself as a Soldier and a leader. First Lieutenant Terry entered the Army in 1942 and was assigned as a platoon leader in the 86th Chemical Mortar Battalion. The 86th received several unit citations for their actions during D-day operations in Normandy, France.

First Lieutenant Terry is one of only nine members of the Chemical Corps to receive the Distinguished Service Cross during World War II. He received the award due to his actions during a prolonged artillery barrage upon his unit in December 1944. A direct hit on an ammunition shed near Soldier barracks detonated white phosphorus and high explosives that set the building on fire. At great personal risk, First Lieutenant Terry ran through the smoke and burning white phosphorus to alert the troops. After reaching safety, he heard a Soldier calling for help. He reentered the barracks and rescued a severely wounded Soldier who was unable to walk. On that day, First Lieutenant Terry showed daring and courage in the face of great danger and saved the lives of six men.

First Lieutenant Terry also holds the distinguished title of inventor of the azimuth position finder. Designed to fire mortars more accurately at night, the device was first used successfully in Brest, France, in September 1944.

First Lieutenant Terry's awards include the Distinguished Service Cross, the Silver Star, the Bronze Star, and the Purple Heart (two awards). First Lieutenant Terry left the Army in 1945 and returned to Pennsylvania where he became a successful businessman and an active member of several veteran organizations. For his exceptional service and enduring contribution to the rich history of the Corps, we honor First Lieutenant Terry with a place in the Chemical Corps Hall of Fame.

2006 Distinguished Members of the U.S. Army Chemical Corps

Compiled by Kimberly S. Whitacre and Captain Ricardo Jones

Four new names were added to the list of outstanding individuals serving the Chemical Corps. The award of the *Distinguished Member of the Chemical Corps* means that these individuals have given a lifetime of service to the Corps and continue to provide support to its primary mission, history, and traditions. These Distinguished Members of the Corps deserve recognition for electing to serve their country and regiment in this fashion. The following individuals were inducted into the 2006 Distinguished Members of the Corps: Brigadier General Dean R. Ertwine (Retired), Colonel Edward "Ted" W. Newing (Retired), Sergeant Major John R. Fuller (Retired), and Dr. John W. Scully.

Brigadier General Dean R. Ertwine (Retired)

Brigadier General Ertwine served the Corps in a variety of positions, including the Deputy for Systems Acquisition and the Director of the Systems Management Center, U.S. Army Communications–Electronics Command, Fort Monmouth, New Jersey; Executive Officer to the Assistant Secretary of the Army (Research, Development, and Acquisition); Commander of the Fire Support Armaments Center, U.S. Army Armament Research, Development, and Engineering Center, Picatinny Arsenal, New Jersey; Commander of the U.S. Army Cold Regions Test Center, Fort Greely, Alaska; Director of Material Testing, U.S. Army Dugway Proving Ground, Utah; Secretary of the General Staff, Deputy G-3; and assistant division Chemical officer for the 9th Infantry Division (Motorized), Fort Lewis, Washington. In October 1999, Brigadier General Ertwine assumed command of the U.S. Army Test and Evaluation Command (later renamed the U.S. Army Developmental Test Command) until his retirement from the Army in August 2002. His awards and decorations include the Legion of Merit (one oak-leaf cluster), the Meritorious Service Medal (four oak-leaf clusters), the Army Commendation Medal, and the Ancient Order of the Dragon.

Brigadier General Ertwine is currently employed by Battelle Corporation as the Vice President for Army Science and Technology Business Development, where he is applying his many years of Army research and development experience to develop future projects. His contributions to training, research, and development deem him worthy of selection as a Distinguished Member of the Corps.

Colonel Edward "Ted" W. Newing (Retired)

Colonel Newing's career has spanned three decades of service. His comprehensive and extensive knowledge of nuclear, biological, and chemical (NBC) defense; weapons of mass destruction; smoke and obscurants; and environmental restoration has earned him the honored status of "recognized expert in the field."

As Commander of the 25th Chemical Company, he pioneered tactics, techniques, and procedures that were captured in the Chemical Corps doctrine revitalization of the 1980s. As the Chief of the Installation Assessments Branch at the U.S. Army Toxic and Hazardous Materials Agency, he led the Department of the Army effort to survey 279 Army installations and determine whether past operations had created a threat for environmental contamination. Colonel Newing's other assignments included operations staff officer (S-3) for the 2d Chemical Battalion; smoke integration officer at the U.S. Army Training and Doctrine Command; and systems integrator at the Department of the Army, Office of the Deputy Chief of Staff for Operations. During Operations Desert Shield and Desert Storm, he engineered the worldwide shifting of decontamination assets, overgarments, and NBC items.

In 1992, Colonel Newing commanded the 84th Chemical Battalion at Fort McClellan, Alabama. He was involved in studies and helped ensure the seamless transition of the U.S. Army Chemical School from Fort McClellan to Fort Leonard Wood, Missouri. Colonel Newing also served as a V Corps Chemical officer in Germany, Commander of the Army Environmental Center, and Chief of Staff of the former U.S. Army Soldier and

Biological Chemical Command (SBCOM) (where he guided the organization through a top-to-bottom structural change).

Colonel Newing retired from the Army in February 2004. His awards include the Legion of Merit (two oak-leaf clusters), the Meritorious Service Medal (seven oak-leaf clusters), the Army Commendation Medal (three oak-leaf clusters), the National Defense Service Medal (two oak-leaf clusters), the Armed Forces Expeditionary Medal (Bosnia), the Southwest Asia Service Medal, the Kuwait Liberation Medal, the Army Superior Unit Award (two), and the Ancient Order of the Dragon.

Colonel Newing is currently the program manager for chemical, biological, radiological, and nuclear (CBRN) readiness, where he directs Army first-responder programs and manages resources to support Department of Defense installation protection programs. For the outstanding and unique contribution he has made in his assignments and the leadership he has provided, the Chemical Corps community welcomes Colonel Newing as a Distinguished Member of the Corps.

Sergeant Major John R. Fuller (Retired)

Sergeant Major Fuller joined the Army in 1976 and completed his basic training at Fort Jackson, South Carolina, followed by Quartermaster Advanced Individual Training at Fort Lee, Virginia. Five years into his career, Sergeant Major Fuller changed his military branch specialty to nuclear, biological, and Chemical specialist (54E). One of his greatest contributions to the Chemical Corps occurred while he served as a drill sergeant in the 82d Chemical Battalion at Fort McClellan, Alabama. Sergeant Major Fuller was directly responsible for turning several thousand young Americans into Soldiers, many of whom went on to serve the Corps with distinction. Other assignments throughout his career included platoon sergeant, 21st Chemical Company, Fort Bragg; battalion Chemical noncommissioned officer, 313th Military Intelligence Battalion, Fort Bragg; first sergeant, 999th Signal Company, Fort Huachuca, Arizona; group noncommissioned officer in charge, Camp Zama, Japan; and sergeant major, Pine Bluff Arsenal, Arkansas. Sergeant Major Fuller is a veteran of Operation Desert Storm and the Liberation of Kuwait campaign. His awards include the Legion of Merit, the Meritorious Service Medal (two oak-leaf clusters), the Army Commendation Medal (five oak-leaf clusters), the Army Achievement Medal (four oak-leaf clusters), the National Defense Service Ribbon (with two stars), and the Ancient Order of the Dragon.

Sergeant Major Fuller is currently a training developer for new equipment training at Fort Leonard Wood. He is an active contributor to the Chemical Corps Regimental Association (CCRA) and frequently addresses students to educate them on the rich history and lineage of the Chemical Corps. Sergeant Major Fuller has dedicated his life to preserving the ideals and integrity of the Chemical Corps, earning him the honor of Distinguished Member of the Corps.

Dr. John W. Scully

Throughout his many years of service, Dr. Scully has been a strong leader, an effective mentor, and a champion for military personnel. Dr. Scully excelled at accomplishing many demanding missions but remained focused on his number one priority—getting the best equipment out to the people who needed it.

Dr. Scully's career in support of the military began in 1967 at the U.S. Army Night Vision Laboratory. Here, he obtained practical laboratory and contractual experience and the theoretical knowledge of optics and imaging systems, including the Man-Portable, Common Thermal Night Sight Program; the Tube-Launched, Optical-Sighted, Wire-Guided (TOW) Antitank Missile System, and the Dragon Missile Site Program. Dr. Scully served at the Night Vision Laboratory for 13 years before leaving in 1980 for the U.S. Army Chemical School.

Dr. Scully joined the Chemical School to help reestablish the Directorate of Combat Development. He was instrumental in establishing a civilian workforce, providing strong leadership, and creating a clear focus and direction. He used his background knowledge from the Night Vision Laboratory to excel in his new CBRN responsibilities. He served as Deputy Chief of the Materiel Systems Division and was the principal directorate technical advisor for NBC programs. Dr. Scully played a critical role in developing the requirements for protective masks and suits, multispectral smoke operations, and chemical and biological standoff detectors.

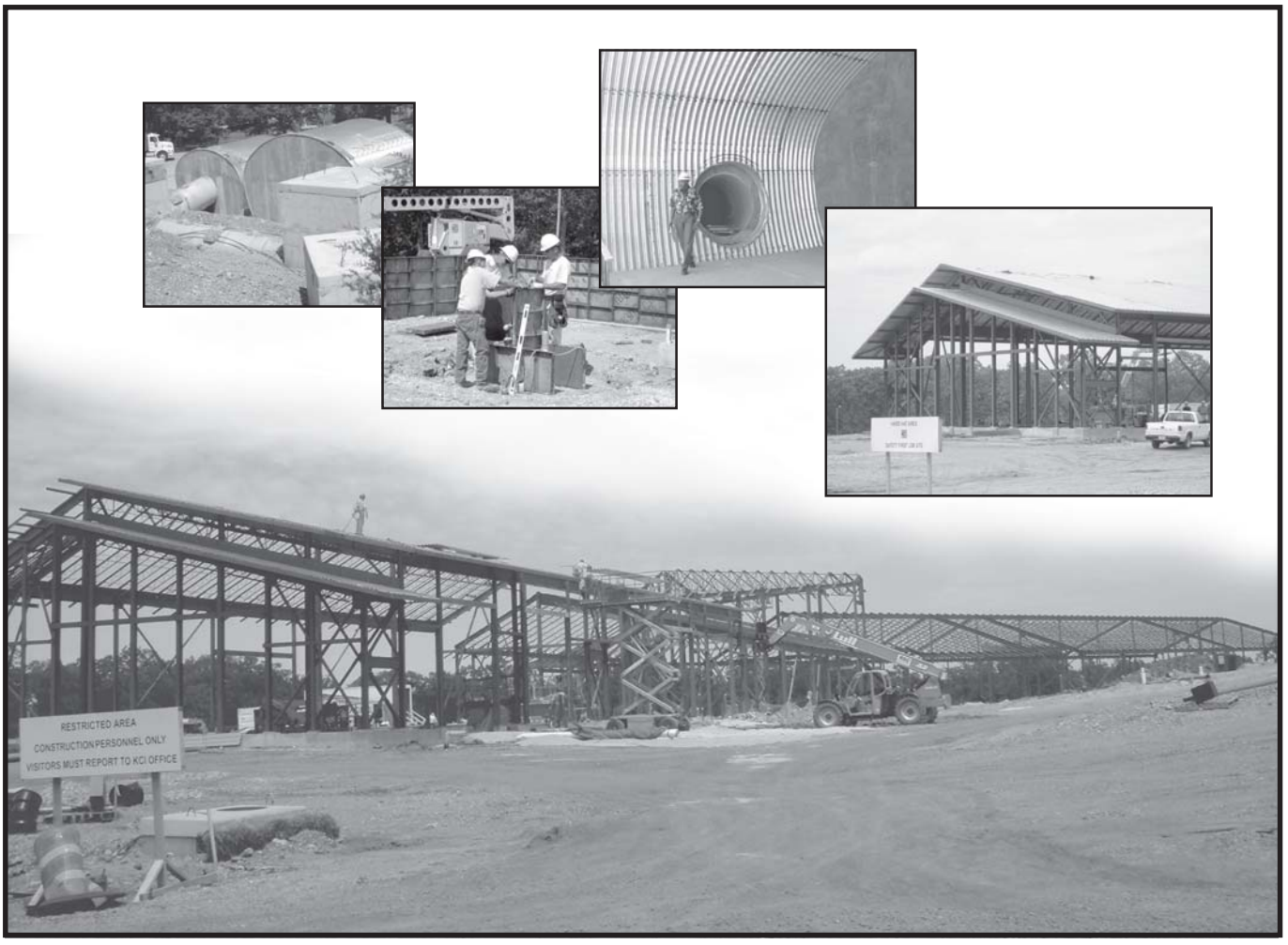
He remains a critical part of the joint CBRN program by encouraging the scientific and technological community to focus on the needs of military personnel. Additionally, Dr. Scully is an active member of the CCRA, serves on the Fort McClellan chapter advisory panel, and holds the honor of Ancient Order of the Dragon. Dr. Scully is a true professional whose contributions have had a lasting impact on the CBRN defense program and the Chemical Corps, earning him the honor of Distiguished Member of the Corps.

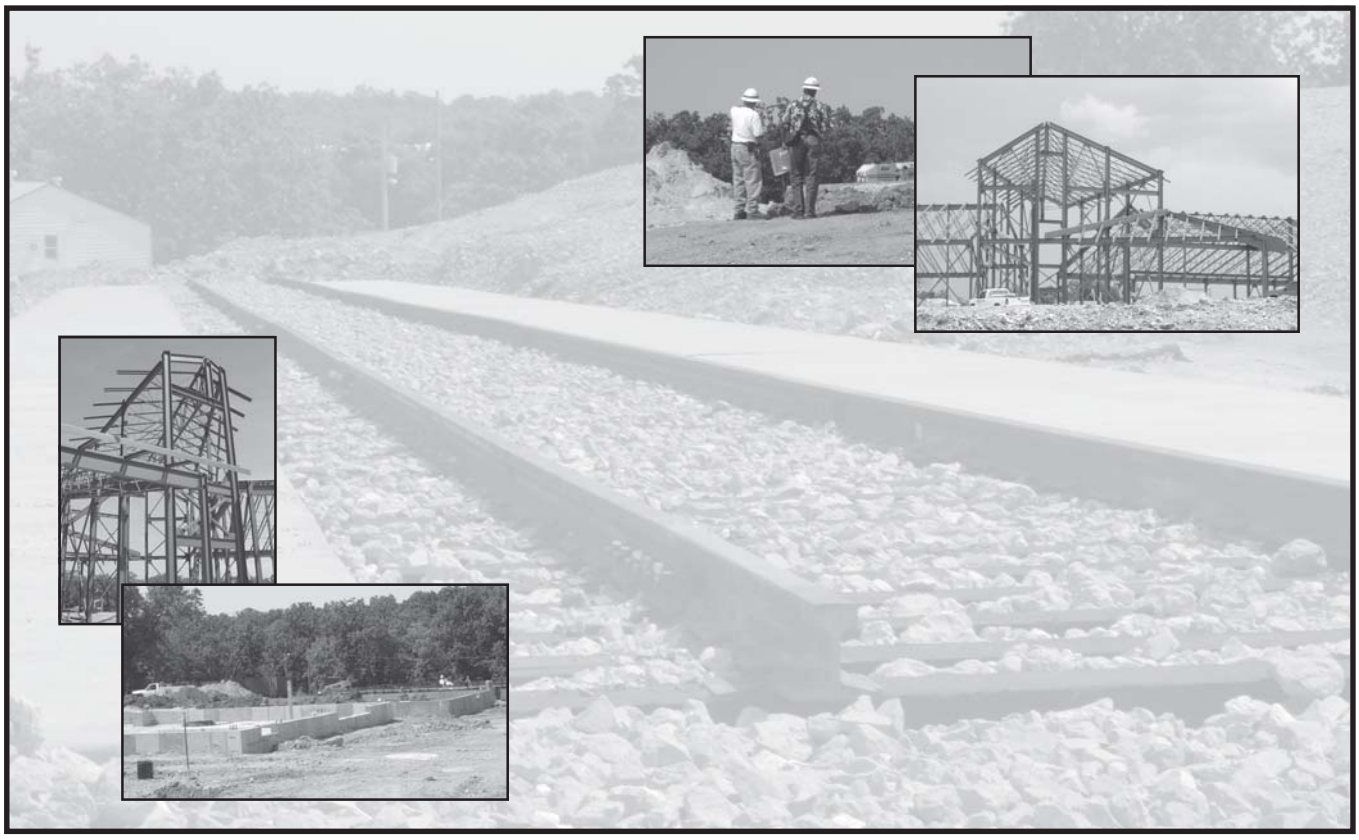
Fort Leonard Wood Continues Work on State-of-the-Art CBRN WMD Response Training Facility

Compiled by Ms. Karen Byrd and Mr. Jimmy Williams

The construction of the First Lieutenant Terry Chemical, Biological, Radiological, and Nuclear (CBRN) Weapons of Mass Destruction (WMD) Response Training Facility is proceeding slightly ahead of schedule. In the main building (classrooms), roof decking has begun. The building structure is set, the footing and structure are complete, and workers are continuing to work on structural steel studs. Construction of the caves and the four-design building, consisting of two warehouses, a factory, and a post office continues. The caves are 90 percent complete, lacking only the retaining wall and backfill dirt to cover the structures.

The $15 million facility, named in honor of World War II hero and Distinguished Service Cross awardee, First Lieutenant Joseph Terry (refer to page 33 for additional information), is scheduled to open in the summer of 2007. The facility will offer state-of-the-art training for Army National Guard Civil Support Teams, U.S. Army Chemical units with homeland security missions, Department of Defense emergency response teams, and other Dragon Soldiers.





Submitting an Article to *Army Chemical Review*

Articles may range from 2,000 to 4,000 words. Send a paper copy along with an electronic copy in Microsoft Word on a 3 1/2-inch or compact disk to *Army Chemical Review,* 464 MANSCEN Loop, Suite 2661, Fort Leonard Wood, Missouri 65473-8926 or e-mail <*acr@wood.army.mil*> with "Submit an Article" in the subject line.

Contributors are encouraged to include black-and-white or color photographs, artwork, and/or line diagrams that illustrate information in the article. Include captions for any photographs submitted. If possible, include photographs of Soldiers performing their missions. Hard-copy photographs are preferred, but we will accept digital images in TIF or JPG format originally saved at a resolution no lower than 200 dpi. Please do not include the images in the text. If you use PowerPoint, save each illustration as a separate file and avoid excessive use of color and shading in graphics and slides. Please do not send photographs embedded in PowerPoint or Microsoft Word documents.

Articles should come from contributors with firsthand experience of the subject being presented. Articles should be concise, straightforward, and in the active voice. Any article containing information or quotations not referenced in the text should carry appropriate endnotes.

Include your full name, rank, current unit, and job title. Also include a list of your past assignments, experience, and education and your mailing address, fax number, and commercial daytime telephone number.

Include a statement from your local security office stating that the information contained in the article is unclassified, nonsensitive, and releasable to the public.

All submissions are subject to editing.

Combat Support Brigade (Maneuver Enhancement)

By Mr. Klaude A."Tony" Miller and Mr. David L. Draker

The Army Transformation Plan (ATP) Roadmap of 2003 laid the blueprint for a radically different Army structure to be in place by 2014. The ATP marks the beginning of the end for the fixed-organization structure within the division and corps. In its place, a modular structure will be the hallmark of the future Army.

Transformation Plan

The Army will consist of new corps and division headquarters designed for joint force operations and for command and control of a tailored mix of forces capable of supporting full-spectrum operations. The traditional combat brigades will be restructured into modular forces called Brigade Combat Teams (BCTs) with improved force mixes, sustainability, and command and control supporting full-spectrum operations. While there will be different types of BCTs (Heavy, Stryker, and Infantry), they will be based on standard configurations, eventually evolving into the Future Combat Systems Brigade.

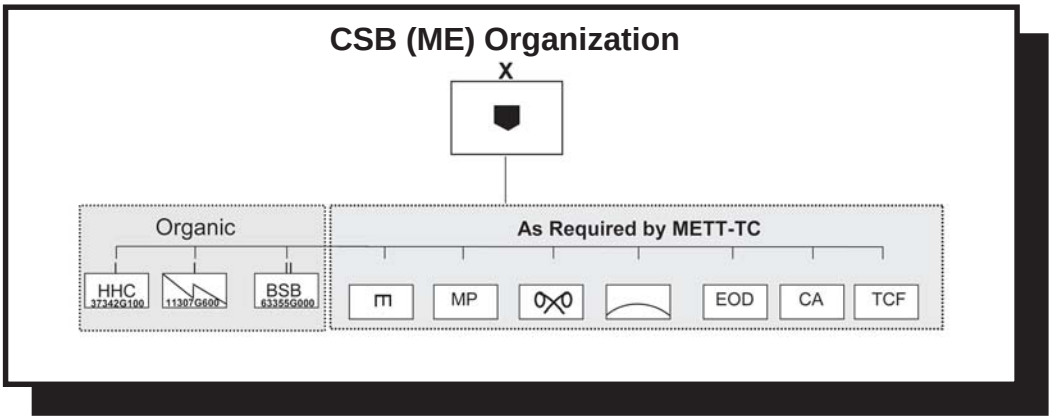
Along with the restructured BCT, some of the supporting structures of the traditional corps and division will be remodeled. There will be five new brigade-sized units designed to support the deployment and sustainment of the new BCTs. The first four new brigades are the Aviation Brigade, the Fires Brigade, the Battlefield Surveillance Brigade, and the Sustainment Brigade. All of these brigades are now under development as their concepts and organizational structures are shaped to support the modularity designs of the future Army. The last brigade element, the Combat Support Brigade (CSB) (Maneuver Enhancement [ME]), is the subject of this article.

CSB (ME) Development

While each of the other support brigades can draw its lineage from previous organizations, the CSB (ME) has no direct precedent. It is a new headquarters structured to provide a single command-and-control element for multiple functions. Formerly, these multiple functions required individual command-and-control elements and force structures. The CSB (ME) combines disparate functional units such as engineer, military police (MP), chemical, signal, rear-area operations, and (when assigned) a tactical combat force (TCF) into the new organization structure.

Requirements

The new modularity concepts of the Army require a force structure that is responsive, flexible, manpower-efficient, and multifunctional. Additionally, the force requires capabilities in both joint- and single-component deployments and operations. Further, the force needs to accommodate new ideas in force packaging and deployment processes and be able to deploy as a self-contained unit in a nonlinear, noncontiguous operational environment. The CSB (ME) has been designed with all of these principles in mind.



The CSB (ME) was previously designated as the Maneuver Enhancement Brigade. The recent Army-level name change has not lessened the basic tenet of the unit's mission: *Provide critical maneuver support to the supported force commander, normally at division level.*

In addition to maneuver support, the CSB (ME) addresses the need to provide multiple-proponent functions throughout the theater of operations without creating the large overhead associated with a division or corps rear command post. The new brigade has two major missions:

- **Maneuver support**—the integrated application of assured mobility and protection capabilities.
- **Terrain management**—within an assigned area of operations.

The CSB (ME) provides maneuver support through the provision of several major tasks: assured mobility, protection, terrain management, infrastructure development, and rear-area operations. These tasks are performed throughout an area of operations to ensure freedom of maneuver and preserve combat power. Previously, the division headquarters performed the functions of terrain management, infrastructure development, and rear-area operations—all of which have now devolved to the CSB (ME) within its area of operations.

- **Assured mobility** encompasses actions designed to guarantee the force commander the ability to move and maneuver where and when he desires, without interruption or delay, to achieve his intent.
- **Protection** covers actions intended to protect the integrity of the individual, the organization, and the force—both individually and collectively.
- **Terrain management operations** are actions that preserve the ability to operate and occupy the areas between the BCTs and the corps.
- **Infrastructure development** is restoration activities that support the return of stability and security in an occupied area and prepare the way for nation building and the return of internal national control.
- **Rear-area operations** enable the use of terrain and urban areas by forces not directly engaged in combat operations and allow the continuous provision of supplies and services to the committed forces.

Design Features

The CSB (ME) has several features to enable the support of full-spectrum operations. The design of the headquarters incorporates the ideas of modularity and multifunctional control. It will be robust and capable of operations in a noncontiguous, nonlinear environment. The only permanent structure of the CSB (ME) is the headquarters element with communications and logistics support.

The CSB (ME) force structure will be a tailored force based on the requirements of mission, enemy, terrain and weather, troops and support available, time available, and civil considerations (METT-TC). Generally, the brigade will consist of three to eight battalions of Engineer, Chemical, and Military Police units and will be specifically tailored with the addition of unique-capability units, such as explosive ordnance disposal (EOD) and civil affairs (CA), as needed.

The brigade headquarters has the necessary staffing to provide command and control for these combined functions. Each function is represented within the brigade staff through a planning and operations cell providing functional recommendations and decision-making information to the S-3 and the command group. Additional capability for multifunctional command and control is provided through a robust liaison cell.

While designed to control multifunctional forces, the brigade can also coordinate with a functional brigade to provide support to the division or corps. Based on the mission, the CSB (ME) may even detach a functional battalion to the functional brigade.

Initially, divisional BCTs will receive task-organized forces from the Army force pool based on METT-TC. When required by the division, the CSB (ME) may provide task forces to support BCT requirements for assured mobility and functional capabilities that go beyond the BCT's organic capabilities. The brigade can organize a task force, provide support and reachback capability, and then on return, refit the task force when the mission is completed.

Because of the nonlinear and noncontiguous nature of the future battlefield, the CSB (ME) was designed to operate in multiple areas. The brigade headquarters can deploy both a main and a tactical command post (CP) with the ability to compose and deploy an additional CP to support short-term or limited-objective missions such as sensitive-site exploitations. The CSB (ME) will have a dedicated organic brigade support battalion (BSB) to provide supply and transportation functions to the deployed units of the brigade.

A last major design feature is the addition of a section within the S-3 to provide the terrain management and rear-area functions. In the division area of operations, the CSB (ME) will perform missions such as coordination of

stationing, base defense, protection of lines of communication, and area and local security.

The individual unit and base cluster retain defense responsibilities of the unit or base. However, when the threat level exceeds the capability of the organization, the CSB (ME) will provide for additional defensive support through the use of the assigned military police or tactical combat force. This assigned force will provide a needed tactical capability short of assigning a BCT with the protection mission.

Transition

While the exact stationing of the new CSB (ME) headquarters organizations has not been decided, the number of units will extend across the entire Army force structure. A limited number of organizations will be placed in the Active Army, while the remainder will be spread throughout the Army National Guard and United States Army Reserves. The first four units will be activated in fiscal year 2006.

The formulation of this new unit will require two major adjustments in the philosophy of training. The first is in the development of the senior leadership through progressive education and experience. The ability to command and control a multifunctional unit demands the development of new skills to coordinate multiple functions into an integrated execution plan. The second is the development of the collective skills within the headquarters to produce a coordinated and integrated understanding of the multiple functions on the tactical and operational environment of the future.

The United States Army Maneuver Support Center (MANSCEN) is currently designing the training plans and materiel to support the formulation of the new headquarters.

Summary

The deployment of the newly created CSB (ME) will provide a valuable and capable element to the Future Force. The brigade will provide support to the committed BCTs; perform missions in its own area of operations to support the offense, the defense, or stability operations; and support the division and corps rear areas with essential control functions.

Mr. Miller is the director of Fort Leonard Wood operations for TecMasters, Inc. A retired lieutenant colonel, he holds a bachelor's in business administration and a master's in management from California Polytechnic University, Pomona.

Mr. Draker is a combat experimentation analyst with the MANSCEN Futures Center, Maneuver Support Integration Division, and is engaged in the development of concepts, organization, and doctrine for the CSB (ME). A retired lieutenant colonel, he holds a master's in logistics management and a master's in business administration from Florida Institute of Technology.

This article is a reprint from the January–March 2006 issue of *Engineer* and has been reprinted in its entirety.

("Chemical Warriors in the Philippine Campaign" continued from page 16)

surrendered on 9 May 1942. Soldiers stationed in Corregidor fared better than the Bataan defenders, but they still suffered a large number of casualties throughout their imprisonment. Some Soldiers died on the "hell ships" bound for Japan, while others were victims of the sinister chemical and biological warfare tests of Unit 731 in Manchuria. When the war ended in 1945, only one out of every three Chemical Soldiers stationed in the Philippine Islands in 1941 returned home. We must never forget their sacrifice!

References:

Brooks E. Kleber and Dale Birdsell, *The Chemical Warfare Service: Chemicals in Combat*, United States Army in World War II, Technical Services Office, Government Printing Office, Washington, D.C., 1966.

Richard M. Gordon, "Bataan, Corregidor, and the Death March: In Retrospect," *<http://home.pacbell.net/fbaldie/In_Retrospect.html>*, accessed on 28 June 2006.

Logbook and journal from the Chemical Warfare Service, Headquarters, Philippine Department, U.S. Army Forces–Far East (USAFFE) and U.S. Forces in the Philippines (USFIP), 8 December 1941 to 17 April 1942.

"Activities of the Chemical Warfare Service in the Philippine Islands During World War II," Headquarters, Army Chemical Center, Edgewood Arsenal, Maryland, 22 November 1946.

Colonel Walk is the U.S. Army Reserve Deputy Assistant Commandant at the U.S. Army Chemical School, Fort Leonard Wood, Missouri.

349th Chemical Company Conducts Domestic CBRN Decontamination Exercise

By Lieutenant Colonel Edward Martinez

It was 1800 hours, and the Soldiers from the 349th Chemical Company (U.S. Army Reserve) were returning from a week of annual training in Yakima, Washington. The unit had spent the previous week conducting decontamination and smoke operations and was heading back to Seattle to prepare for an upcoming chemical, biological, radiological, and nuclear (CBRN) exercise with personnel from the 6250th U.S. Army Hospital.

What the Soldiers of the 349th did not realize was that they were about to go through a domestic-response casualty decontamination (DRCD) exercise conducted by the Fifth U.S. Army (with support from the Seattle Fire Department and medical staff from Northwest Memorial Hospital). Personnel from Delta Team, Civil Support Training Group, Fifth U.S. Army, Fort Sam Houston, Texas, had been working the joint effort with officials from the city of Seattle and Northwest Memorial Hospital for six months. According to the Delta Team Chief, the staffs from both organizations were enthusiastic about the training opportunity. The exercise gave hospital personnel the opportunity to work side by side with local military organizations and provided officials from the city of Seattle the opportunity to view the military assets available to provide assistance in the event of a weapons of mass destruction (WMD) attack.

The exercise was conducted for two primary reasons: to conduct an external evaluation of the DRCD capabilities of the 349th Chemical Company and to foster a relationship between the military and Seattle's first responders. In the last few years, the 349th has conducted several joint WMD exercises with local emergency personnel to enhance the incident response capabilities of all personnel involved. The 349th Chemical Company is based at Camp Lawton, northwest of Seattle.

Nine nurses from Northwest Memorial Hospital participated in the exercise. Additionally, senior hospital staff viewed the training to get a better understanding of the capability and to foster the alliance. The exercise took place on the lawn of the hospital administrative building. In an actual emergency, the decontamination unit would set up operations at the emergency room entrance so that patients could receive medical care immediately after being decontaminated.

On the morning of the exercise, the defense coordinating officer contacted the commander of the 349th Chemical Company to report a training scenario with a chemical attack at Seattle Seahawk Stadium. The company commander immediately dispatched an advance party to meet with the incident commander for an update on the situation and to survey the area chosen for the decontamination site. Special interest was paid to critical factors such as the wind direction, the terrain elevation, and the expected direction of arrival for incoming casualties. Other essential items reviewed by the advance party were the locations for remote alarms, site security, communications, and wastewater collection.

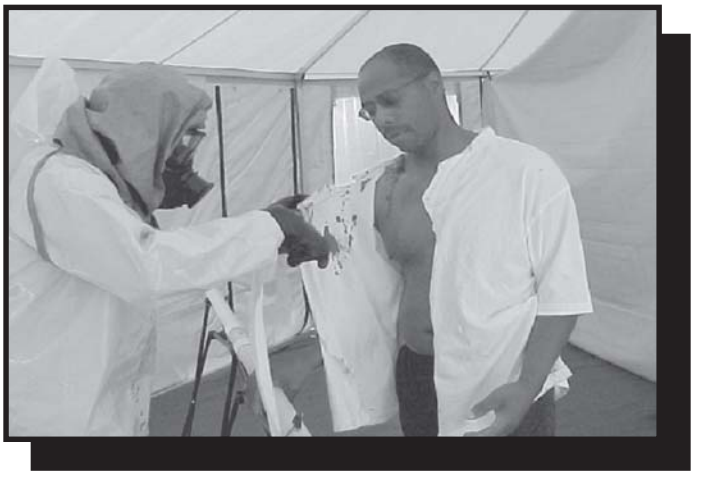
The company's main body arrived within thirty minutes of the advance party and was immediately briefed by their commander on the site location, including the major areas and equipment sites. Additional information was briefed to the company section chiefs and medical personnel as other personnel immediately began to off-load the 5-ton trucks and assemble the decontamination line.

At the casualty collection point and triage station, patients arrived as walk-ins or were delivered by emergency vehicles. Army medical personnel and four civilian nurses triaged patients as they arrived. Patients were placed in one of four categories—expectant, immediate, delayed, or minimal—based on an assessment of their injuries. After initial triage evaluations, patients were classified as ambulatory or nonambulatory casualties. Unit personnel were designated as litter bearers for the nonambulatory, reserving the trained medical personnel for patient care. Based on the severity and urgency of their injuries, patients were processed through the log-in station, where information was obtained and personal valuables were collected, recorded, and placed in secure bags for later decontamination and return to the patient.

The next station in the decontamination process was the undress tent. In the undress area, the patients removed their clothing and, thus, most of the exterior contamination. Two decontamination lines were set up, one for ambulatory patients and one for nonambulatory patients. Ambulatory patients were escorted to the undress tent where they were met by a company Soldier. The Soldier instructed patients to undress and provided assistance with placing contaminated clothing in sealed plastic bags for disposal. Nonambulatory patients were wheeled on litters to the nonambulatory tent and told to remain on backboards. In the nonambulatory undress tent, two Soldiers cut off patients' clothing while medical personnel looked on and

provided advice on handling procedures based on injuries. Scissors and rubber gloves were rinsed often in decontamination solution to prevent cross contamination. All contaminated garments were discarded in a plastic bag-lined trash can outside the tent window. The ambulatory patients in the first decontamination line were guided to the shower stations to shower with decontamination and rinse solutions under the supervision of a station operator.

In the nonambulatory decontamination line, the patients were rolled on backboards and placed on a metal roller/conveyor, where operators washed them with



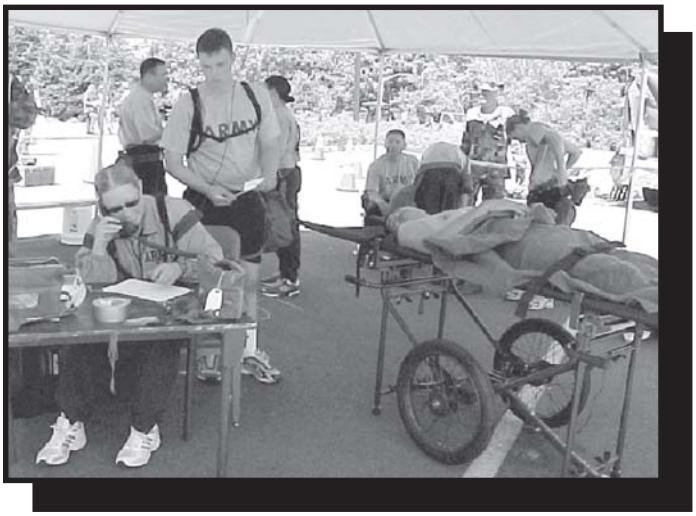
decontamination and rinse solutions. Medical personnel were present to monitor patient status and to advise and direct the operators on the proper patient handling techniques based on injuries.

After the decontamination shower station, both ambulatory and nonambulatory patients were monitored with chemical detection devices to determine if any

residual contamination was present in excess of the predetermined allowable limits set by the incident commander. If a patient's level of contamination was within the allowable limits, he proceeded to the next station. If the level exceeded the limits, he underwent a second decontamination wash and rinse treatment.

Patients cleared for release proceeded to the redress tent station, toweled off, redressed in garments given to them, and proceeded to the log-out station. Nonambulatory patients were toweled off, draped in a blanket, and told to remain on backboards. The patients were then lifted by a four-person crew onto a wheeled litter and transported to the log-out station. Released patients were escorted to a disposition area for transport to a medical facility to receive medical care. Medical personnel monitored the patients to ensure that those who needed immediate care were transported on a priority basis.

This training experience was beneficial to all participating parties. According to the comments shared during the after-action review, several lessons learned were captured and discussed. All participants indicated that they intended to incorporate changes in their programs and future operations. The tactics, techniques, and procedures for planning a large-scale WMD event proved to be extremely educational for everyone involved. But the greatest part of this training exercise was the dedication to get it right! Everyone took it seriously because they understood the importance of the training and the relationship it plays in our existence as a free Nation. Vigilance and preparedness are the key factors that will ensure us a free tomorrow. We must remain prepared by sharing our ideas, knowledge, and lessons learned. This will strengthen our ability to reduce the severity of attacks and defend our great Nation against terrorism.



Lieutenant Colonel Martinez is an Army Reserve Medical Service Corps officer assigned to Headquarters, Fifth U.S. Army, Civil Support Readiness Directorate–West. He specializes in dual areas of concentration as a microbiologist (71A) and an environmental science officer (71D).

2006 Writing Contest

Each year, the Chemical Corps Regimental Association sponsors a writing contest. The contest is open to military personnel in all branches and services, including allied nations and civilians of any nationality. The purpose of the contest is to stimulate thinking and writing on issues of concern to the Chemical Corps.

The themes for the 2006 writing contest are—

- **Chemical, biological, radiological, and nuclear (CBRN) tasks in full-spectrum operations.** Compare and contrast CBRN tasks for Soldier, leader, and collective accomplishment in full-spectrum operations (offensive; defensive; military support for stability, security, transition, and reconstruction operations [SSTR]; and defense support of civil authorities [DSCA]). Discuss traditional CBRN tasks performed during major combat operations (MCO), traditional and nontraditional tasks performed during stability operations (such as foreign consequence management), and civil support operations (such as domestic consequence management). Describe the similarities or differences in like tasks (such as site reconnaissance during MCO, SSTR, and DSCA) performed in full-spectrum operations.
- **Chemical units in the modular force.** Discuss the capabilities, limitations, and employment (including tactics, techniques, and procedures) of the modular Chemical companies—Chemical company (combat support), Chemical company (heavy), Chemical company (biological detection), Chemical company (smoke) (mechanized), and Chemical company (smoke) (wheeled)—in the Army modular force and the CBRN reconnaissance platoons in infantry, heavy, and Stryker brigade combat teams (BCTs).
- **The Chemical Corps' role in protecting forces from environmental and industrial hazards.** Identify the missions that Chemical units should conduct to protect forces (personnel and equipment) from environmental and industrial hazards (the full range of CBRN hazards), and describe the complementary relationships and roles of Chemical and Engineer units (such as pollution prevention and hazardous material and waste disposal) and medical operations (such as preventive medicine and medical laboratory operations) and the coordination required between the two Corps' missions. Discuss the potential roles that other corps (such as the Military Police or Quartermaster Corps) can contribute to force protection operations involving CBRN hazards.
- **The historical progression of the use of nuclear and radiological weapons.** Describe the role of nuclear weapons at the strategic, operational, and tactical levels from 1945 to the present, including the emergence of radiological weapons as a threat. Discuss the potential roles of nuclear and radiological weapons over the next 25 to 30 years and the capabilities that the United States should develop or retain to deter and defend against these threats.
- **Network-enabled CBRN operations.** Discuss how CBRN defense operations, including staff functions and capabilities, will change or should change at the BCT level given a future combat system (FCS)-equipped, network-enabled future force.

Each article should be submitted as a double-spaced paper manuscript accompanied by a compact disk containing the file in Microsoft Word format. The article should be between 500 and 2,500 words in length and contain the appropriate footnotes, bibliography, and graphic or photo support. Hard copy photos are preferred; however, if digital photos are submitted, they should be saved at a 200 dpi/ppi or higher resolution and at the actual size. In addition to the manuscript, submissions should include a cover sheet with the author's name, title, organization, complete mailing address, and a short biography.

To ensure anonymity in the selection process, the author's name should not appear in the manuscript itself. The selection panel will rank submissions on a 100-point scale, with up to 40 points assigned for writing clarity, 30 points for relevance to Chemical Soldiers, 20 points for general accuracy, and 10 points for originality.

The authors of the winning articles will be awarded the following:

First place, $500
Second place, $300
Third place, $150

The deadline for submissions for the 2006 writing contest is 2 January 2007. Please forward your submissions to—

Mr. David C. Chuber
Chemical School Historian
401 MANSCEN Loop, Suite 1041
Fort Leonard Wood, Missouri 65473-8926

For additional information, contact Mr. Chuber at—

Telephone: DSN 676-7339; Commercial (573) 593-7339
E-mail: david.chuber@us.army.mil

Hellfire Chapter of the Chemical Corps Regimental Association

By Captain Brian Cyr

It took eight years, but the Hellfire chapter of the Chemical Corps Regimental Association (CCRA) has been realized. This was Lieutenant Colonel Tommy Steele's final mission as commander of the 84th Chemical Battalion (the Hellfire battalion). "I'm glad it's a done deal. I had a lot of help in making this happen," Steele said.

Sixty-two members of the 84th (past and present) were inducted as charter members when the chapter was stood up on 21 June 2006. The new president, Lieutenant Colonel Wayne Thomas, hopes to see the chapter grow rapidly. "This has been long overdue, and now Fort Leonard Wood [Missouri] has a chapter of its own," Thomas said. CCRA members with strong ties to the 84th Chemical Battalion (including those stationed at locations other than Fort Leonard Wood) can request membership in the Hellfire chapter by contacting Shannon Hazlett by e-mail at <*ccramanager@earthlink.net*> or by telephone at (573) 329-0600.

CPT Cyr is the Chief of Chemical Training Department, 84th Chemical Battalion, Fort Leonard Wood, Missouri.

U.S. Army Chemical School Web Site

Do you need up-to-date information about chemical career management, courses, equipment, doctrine, or training development? All of this information and more is available at the U.S. Army Chemical School Web site. Log on to <*http://www.wood.army.mil/usacmls/*> to check out this great resource.

2007 Army Deployment Excellence Award Competition

By Mr. Henry H. Johnson

The 2007 Army Deployment Excellence Award (DEA) competition is open to Active Army, Reserve, and National Guard units and installations. To participate in the DEA Program, a unit is required to have executed or supported a training or contingency deployment during the competition year. The competition year began on 1 December 2005 and will run through 30 November 2006. All units and installations are encouraged to participate in this elite competition. Two unit representatives from each winning and runner-up category will receive an expenses paid, four-day trip to Washington, D.C., to accept the unit awards. The trip includes travel, per diem, lodging, and ground transportation costs; time for shopping; tours of the D.C. area; and a photo with the Army Chief of Staff. Significant dates for the 2007 competition include the following:

- 1 December 2005–30 November 2006: This is the 2007 DEA competition period.
- 1 December 2006–31 January 2007: Packet submissions due. All packets must be submitted through the chain of command.
- 31 January 2007: Nomination packets are due from major commands to the DEA evaluation board.
- 5–16 February 2007: The DEA board screens packets to select semifinalists.
- 1–25 March 2007: DEA teams visit selected semifinalists and conduct an on-site validation of deployment practices.
- 9 April 2007: The Army G-4 selects and announces the winners via a Department of the Army message.
- 17 May 2007: DEA awards are presented at the Chief of Staff, Army Combined Logistics Excellence Award ceremony and banquet.

DEA guidance and evaluation criteria can be found on the Deployment Process Modernization Office Web site *<http://www.deploy.eustis.army.mil/Default.html>*.

Points of Contact for the DEA Program

Program Manager: Mr. Henry H. Johnson ***<henry.h.johnson@us.amry.mil>*** **Telephone: DSN 927-1833; Commercial (757) 878-1833**

Major Command	Point of Contact	Email Address	Telephone
National Guard Bureau	Mr. T. J. Epps	*<TJ.epps@ngb.army.mil>*	(703) 607-7434
U.S. Army Reserve Command	Mr. Mario Camacho	*<mario.camacho@usar.army.mil>*	(404) 464-8165
U.S. Army Forces Command	Ms. Kesha Daniel	*<kesha.daniel@forscom.army.mil>*	(404) 464-7821
U.S. Army Installation Management Agency	Mr. Robert Robb	*<robert.robb@hqda.army.mil>*	(703) 602-4334
Surface Deployment and Distribution Command	Ms. Shenita Gooding	*<goodings@sddc.army.mil>* (703)	428-2463/3266
U.S. Army Network Enterprise Technology Command	Mr. Richard A. Williamson	*<richard.williamson@netcom.army.mil>*	(520) 538-6114/8877
U.S. Army Corps of Engineers	Mr. Tommy McClain	*<tommy.mcclain@usace.army.mil>*	(703) 761-1245
U.S. Army, Europe	Major Eric Hutchinson	*<eric.hutchinson@hq.hqusaeur.mil>*	DSN 314-370-6470
U.S. Army, Pacific	Major Kristin A. Aberg	*<kristin.aberg@us.army.mil>*	(808) 438-8654
U.S. Army Special Operations Command	Ms. LaRetta Wager	*<wagerl@soc.mil>*	(910) 432-3925
Eighth U.S. Army, Korea	Captain Julie A. Myers	*<julie.myers@korea.army.mil>*	DSN 315-725-8383
U.S. Army Medical Command	Ms. Tiffani Morrell	*<tiffani.morrell@cen.amedd.army.mil>*	(210) 221-6040
U.S. Army Intelligence and Security Command	Mr. Julian "Bruce" Grover	*<jbgrove@inscom.army.mil>*	(703) 806-4946
U.S. Army Criminal Investigations Command	Ms. Patricia G. Evans	*<pat.evans4@belvoir.army.mil>*	(703) 806-0329

2006 Army Deployment Excellence Award Program Winners

By Mr. Charles K. Ledebuhr

The 2006 competitive year proved to be another success for the Deployment Excellence Award (DEA) Program, with great units and installations setting the pace in deployment operations. The Army's operational tempo, coupled with increased awareness of the DEA Program, combined to result in the largest level of participation ever. The program experienced significant gains, particularly in the operational, supporting, and installation categories.

This year's award ceremony was held on 18 May 2006 at the Hilton Alexandria Mark Center in Alexandria, Virginia. Army Deputy Chief of Staff, G-4 (Logistics), Lieutenant General Ann E. Dunwoody, presented the DEA awards to the honored units. The Army Assistant Chief of Staff, G-3 (Operations and Plans), Major General Michael W. Symanski, and the Commanding General of the U.S. Army Transportation Center and Fort Eustis, Virginia, Brigadier General Mark E. Scheid, assisted with the award presentations. An awards banquet capped the day of recognition. General Benjamin S. Griffin, Commanding General of the U.S. Army Materiel Command, provided remarks at the banquet and challenged units and installations to maintain their high deployment standards. Prior to the ceremony and banquet, unit representatives had the opportunity to tour the Pentagon, the Capitol, and the National Mall.

In the DEA Program, Army units competed by component (Active Army, Reserve, and National Guard) in large-unit (battalion and above); small-unit (company and below); supporting-unit; all-Army installation; and all-Army, operational-deployment categories. The operational-deployment category was open to Army units that deployed on operational missions, including the Global War on Terrorism and peacekeeping operations (in the large-unit and small-unit categories). The Army's up-tempo and strong major command (MACOM) involvement brought a number of new units and installations into the competition.

The winner in the installation category for the second year running was Fort Hood, Texas. Its outstanding support to nine overlapping deployments, coupled with the challenges of dealing with Hurricanes Rita and Katrina, resulted in an extremely strong showing. Congratulations to the terrific installation deployment team serving Fort Hood!

In a very close competition, a newcomer, Fort Bragg, North Carolina, was the runner-up in the installation category. The Fort Bragg installation team received strong endorsements from its diverse customer base and demonstrated its outstanding capabilities to support scheduled and no-notice deployments.

The Military Surface Deployment and Distribution Command swept the Active Army, supporting-unit category. The 832d Transportation Battalion from the Port of Jacksonville, Florida, won the category; and the 838th Transportation Battalion from the Port of Rotterdam, Netherlands, came in a close second.

The Eighth U.S. Army, Korea, a winner last year in the operational-deployment category, continued to excel in 2006. The 305th Quartermaster Company from Yongsan won the Active Army, small-unit category; and the 728th Military Police Battalion from Daegu was the runner-up in the Active Army, large-unit category.

The U.S. Army Network Enterprise Technology Command was a first-time winner with the 40th Signal Battalion from Fort Huachuca, Arizona, winning the Active Army, large-unit category.

The Army Reserve had a number of outstanding entries, including the winner of the Reserve, supporting-unit category—Headquarters and Headquarters Command (HHC), U.S. Army Civil Affairs and Psychological Operations Command, Fort Bragg. The command formed movement support teams with internal assets and supported a complex operation involving 19 different special operations units, 1,200 Soldiers, and 160 short tons of cargo. The teams ensured that deploying Army Special Operations Forces met deployment timelines, prepared timely and accurate movement data, and properly used transportation assets.

2006 DEA Award Recipients	
Active Army, large-unit	40th Signal Battalion, Fort Huachuca, Arizona Runner-up: 728th Military Police Battalion, Daegu, Korea
Active Army, small-unit	305th Quartermaster Company, Yongsan, Korea Runner-up: HHC, 5th Special Forces Group, Fort Campbell, Kentucky
Active Army, supporting-unit	832d Transportation Battalion, Jacksonville, Florida Runner-up: 838th Transportation Battalion, Rotterdam, Netherlands
Reserve, large-unit	483d Transportation Battalion, Vallejo, California Runner-up: 1190th Deployment Support Brigade, Baton Rouge, Louisiana
Reserve, small-unit	828th Quartermaster Company, Wilkes Barre, Pennsylvania Runner-up: 401st Transportation Company, Battle Creek, Michigan
Reserve, supporting-unit	HHC, U.S. Army Civil Affairs and Psychological Operations Command, Fort Bragg, North Carolina Runner-up: 643d Area Support Group, Fort Polk, Louisiana
National Guard, large-unit	1st Battalion, 151st Infantry Regiment, Indianapolis, Indiana Runner-up: 224th Engineer Battalion, Fairfield, Iowa
National Guard, small-unit	D Company, 113th Aviation Regiment, Reno, Nevada Runner-up: 41st Adjutant General Company, Salem, Oregon
National Guard, supporting-unit	Joint Force Headquarters, Florida National Guard, St. Augustine, Florida Runner-up: Camp Atterbury, Edinburgh, Indiana
All-Army installation	Fort Hood, Texas Runner-up: Fort Bragg, North Carolina
All-Army, operational-deployment, large-unit	426th Brigade Support Battalion, 101st Airborne Division (Air Assault), Fort Campbell, Kentucky
All-Army, operational-deployment, small-unit	B Company, 1-35 Armor Battalion, 1st Armored Division, Baumholder, Germany

The National Guard also had some standout units, including the Florida Joint Force Headquarters, the winner of the National Guard, supporting-unit category. The headquarters supported the deployment of 29 units and 1,800 Soldiers in the Global War on Terrorism, while simultaneously conducting military support to civil authorities during four major hurricane recovery operations.

For information on competing in the 2007 DEA Program, contact your MACOM DEA Program point of contact (listed on page 46) or the DEA Program Manager, Mr. Henry Johnson. Program guidance and evaluation criteria are also available on the DEA Web site <*http://www.deploy.eustis.army.mil/Default.html*>.

Mr. Ledebuhr is Chief of Operations at the Deployment Process Modernization Office.

Recent issues of *Army Chemical Review* are now available online at <*http://www.wood.army.mil/chmdsd/default.htm*>. If you are interested in an article that is not on the Web site, send your request to <*acr@wood.army.mil*>. Type *"Army Chemical Review"* in the subject line, and list the article(s) requested in the body of the message. Include your name, unit, address, and telephone number with your request.

Lineage and Honors

87th Chemical Mortar Battalion

Commanded by: *Lieutenant Colonel James Batte*
Activated: *22 May 1943 at Camp Rucker, Alabama*
Redesignated: *26 April 1945 as the 87th Chemical Mortar Battalion*
Deactivated: *6 November 1945 at Fort Benning, Georgia*
Campaigns During World War II: *Ardennes-Alsace, Central Europe, Normandy, Northern France, and the Rhineland*
In Commemoration: *87th Chemical Mortar Battalion monument, dedicated on 12 June 1998 at the former Edgewood Arsenal, Maryland*

The Dragon Soldiers of the 87th Chemical Mortar Battalion used their training and equipment to rule the battlefield. During World War II, this battalion was one of the most sought-after fire support units in the European theater of operations. Originally, the 87th was designed for firing chemical shells, but the Allied and Axis forces in World War II observed policies against the first use of chemical weapons. So the 87th served in the secondary role of providing conventional, indirect fire support to front line infantry troops using its 4.2-inch mortars to fire white phosphorus shells for smoke screening and high-explosive casualty effect.

The 87th Chemical Mortar Battalion landed in Normandy on 6 June 1944 (D-day) in support of V Corps and VII Corps on Omaha and Utah Beaches. During that year, the ability of the 87th to keep up with the rapid movement of attacking infantry became almost legendary. The platoons advanced forward faster than traditional artillery units and, as a result, were more reliable in their ability to provide supporting fire when and where it was needed most. This was not easy on the men or the equipment because the battalion was sometimes required to advance three or four times a day. During the Normandy Campaign, Soldiers in the 87th were awarded twenty-two Bronze Stars and three Silver Stars for valor.

During the attack on Cherbourg, France, the 87th maintained a rolling barrage for the 8th Infantry Regiment. It was so effective that the infantry regimental commander told the artillery commander "to hell with the artillery. I'll use 4.2s. They do a better job anyway." Brigadier General Theodore Roosevelt, Jr., called the battalion the most effective rolling barrage he had ever seen.

In the battles that followed, the battalion became the most sought-after fire support unit on the battlefield. The companies never knew on any given day which units they would be attached to, but the Soldiers performed their jobs whenever they were called upon. In direct support of infantry units, the 87th lost 11 officers and 70 enlisted men as casualties.

In September 1944, the first elements of the 87th made their historic crossing into Germany. The battalion also fought in the bloody Hurtgen Forest battle and with the 101st Airborne Division at the Battle of the Bulge, while still defeating German tanks with their mortars and saving the town of Sadzot. The battalion is credited for capturing a German command post and several artillery units.

The unit also had the sad experience of finding only three prisoners alive out of more than 4,000 in the Nordhausen concentration camp, where they found more than 25,000 bodies burned in the crematorium.

The 87th spent 326 days in combat zones, with only 9 days of rehabilitation and maintenance. They fired a total of 109,604 high-explosive rounds and 74,406 white phosphorus shells.

The Soldiers of the 87th Chemical Mortar Battalion exhibited the Army Values of loyalty, duty, respect, selfless service, honor, integrity, and personal courage. Veterans of the 87th have exemplified the proud tradition of the Chemical Corps that lives on today. Present and future Soldiers will carry the commitment to service forward through lessons learned from the heroes that served and are part of the Chemical Corps tradition.

Endnote:

Two members of the 87th Chemical Mortar Battalion were inducted into the 2006 Chemical Corps Hall of Fame: Brigadier General James Batte and Colonel Julian Brunt.

References:

"History of Camel Orange, Company D–87th Chemical Mortar Battalion," historical records.

John D. Hunn et al., *A Company, 87th Chemical Mortar Battalion at War*, compiled by Corporal Robert L. Greenleaf.

This information was provided by Mr. David Chuber, Chemical School Historian.

Archive information for Chemical units is maintained at the U.S. Army Chemical School History Office. Veterans are encouraged to send oral interviews, photographs, and documents to help us preserve the rich history of the Corps. For additional information or to submit information, contact the History Office by telephone at (573) 563-7339; by e-mail at <*david.chuber@us.army.mil*>; or by mail at 401 MANSCEN Loop, Suite 44, Fort Leonard Wood, Missouri 65473-8926.

Information provided by Colonel Robert Walk

Soldier Qualification Training

There are three courses being taught through five Total Army School System (TASS) battalions. The schedule for these courses can be found by accessing the Army Training Requirements and Resources System (ATRRS) (see Web site <*https://www.atrrs.army.mil/*> for information on accessing ATRRS). A brief description of each course follows:

- **74D10 Military Occupational Specialty Training (MOS-T) Course (formerly the Reclassification Course).** The 74D10 MOS-T course has four phases. Phase I is offered via distributed learning (DL). But don't try to complete it in one weekend—it cannot be done. Phases II and IV are offered as resident training at Fort Leonard Wood, Missouri. Phase III is offered as nonresident instruction and is provided in the TASS battalion regions.
- **Basic Noncommissioned Officer Course (BNCOC).** The 74D BNCOC has four phases. Phase I is common to all MOSs. Phases II and IV are 74D-specific, resident training at Fort Leonard Wood. Phase III is 74D-specific, nonresident instruction provided in the TASS battalion regions.
- **Advanced Noncommissioned Officer Course (ANCOC).** The 74D ANCOC has three phases. Phases I and III are resident training at Fort Leonard Wood. Phase II is nonresident instruction provided in the TASS battalion regions.

Instructors at the TASS battalions access the courseware for the proponent schools through the Digital Training Access Center (DTAC) Web site. TASS courseware is accessible as a downloadable file stored in the Blackboard learning management system. The Chemical Quality Assurance Element contacts the instructors at the TASS battalions by e-mail and provides them with instructions on how to access the courseware.

Officer Training

Initial-entry Chemical Corps officer training is transitioning from the Chemical Officer Basic Course (COBC) to the Basic Officer Leader Course (BOLC) in July 2006. The BOLC is a three-phase course that first trains officers to be warrior leaders and then moves on to provide specialized training. Personnel in all components—U.S. Army Reserve (USAR), U.S. Army National Guard (ARNG), and Active Army—attend the same courses.

Phase I is precommissioning training at the U.S. Military Academy, Reserve Officer Training Corps (ROTC), or Officer Candidate School (OCS). After commissioning, new lieutenants attend Phase II at Fort Benning, Georgia, or Fort Sill, Oklahoma, to learn Soldier warrior tasks and drills. Phase III, conducted at Fort Leonard Wood, covers branch-specific training, focusing on chemical, biological, radiological, and nuclear (CBRN) defense. The new course length is equivalent to the old COBC; however, the phase levels may be an issue for reserve component (RC) officers, as time must allow for travel for Phases II and III.

The Reserve Component Chemical Captains Career Course (RC-CMC3) has changed from a two-phase course to an extensive five-phase course. Phase I covers common-core material and is required for all captains, regardless of their component or branch designation. Phase II covers chemical technical material and is offered via DL. The completion of Phase II is a prerequisite for attending Phase III training. Phase III, offered at the U.S. Army Chemical School at Fort Leonard Wood, is a two-week resident phase that focuses on branch-specific training for conducting chemical, smoke, radiological, and toxic-agent operations; managing the effects of biological agents; learning and developing defense concepts; and inciting hazardous material (HAZMAT) awareness. Phase IV is the DL portion of the combined arms exercise (CAX) program. The tasks in this phase prepare officers for company command and brigade staff assignments. Phase V, also conducted at Fort Leonard Wood, is the CAX resident portion and culminates in a military decision-making process that uses state-of-the-art battle simulation equipment. Beginning in October 2007, Military Police and Engineer students will train with Chemical RC-CMC3 students.

Officers transferring to the Chemical branch after attending another branch's officer basic course must attend the CBRN Defense Course. Other required training will depend on the officer's level of education.

U.S. Army Reserve- and National Guard-Specific Training

Civil Support Skills Course. The USACMLS continues to provide National Guard (NG) Soldiers and Airmen initial Weapons of Mass Destruction–Civil Support Team training. The course is eight weeks long and covers HAZMAT, site entry, sampling, survey operations, and practical exercises.

Domestic-Response Reconnaissance Training. The USACMLS is piloting the CBRN Responder Course. The intensive, two-week course provides certification training for HAZMAT, sampling, and entry operations. The initial intent is to supplement the RC's training efforts by producing HAZMAT-qualified Soldiers, but the future intent is to provide all HAZMAT USAR and ARNG training. The course is especially applicable and beneficial to USAR and NG CBRN enhanced response force package personnel, Active Army Chemical Soldiers, and Army civilians (civilians requiring the training for their positions). Expect to hear much more about this training program in the near future.

Mass-Casualty Decontamination Training. In Fiscal Year 2007, the USACMLS will pilot the mass-casualty decontamination training program to expand the original USAR domestic-response casualty decontamination training program and ensure that the necessary certification training is covered. The new course is expected to be an intensive, ten-day training period. Again, expect more information about this training program in the near future.

USACMLS Personnel Issues

Authorized Active Guard and Reserve (AGR) Positions. There are currently six authorized AGR positions. Five of these positions are filled—the Deputy Assistant Commandant–Reserve Component (DAC-RC) (a USAR colonel position), the Deputy Assistant Commandant–National Guard (DAC-NG) (an Army NG lieutenant colonel position), two training developers (USAR major and master sergeant positions), and two combat developers (USAR lieutenant colonel positions) (one of these lieutenant colonels is currently serving as the Director, Incident Response Training Detachment in a temporary position).

Drilling Individual Mobilization Augmentee (DIMA) Positions. The USAR has twenty authorized DIMA positions in the USACMLS—twelve officer slots (captain through lieutenant colonel) and eight noncommissioned officer slots (sergeant first class through sergeant major). Our mission is to expand the USACMLS training capabilities during mobilization periods. The USAR currently supports the RC-CMC3 training mission. Our goal is to achieve 100 percent coverage of authorized instructor positions with qualified personnel. We strive to improve CMC3 and RC-CMC3 training through our work. We are always looking for qualified Soldiers to fill these positions, so contact us if you are interested or need additional information about reserve training.

- Colonel Robert Walk (DAC-RC), telephone (573) 563-8050, e-mail <*robert.d.walk@us.army.mil*>.
- Lieutenant Colonel Carlos Brown (DAC-NG), telephone (573) 563-7676, e-mail <*carlos.brown1@us.army.mil*>.
- Master Sergeant Cassie Hill-Johnson (DAC senior noncommissioned officer), telephone (573) 563-7667, e-mail <*cassie.hill@us.army.mil*>.
- Ms. Sandy Meyer (DAC secretary), telephone (573) 563-6652, e-mail <*sandy.meyer@us.army.mil*>.

FROM THE SCHOOL

In a continuing effort to provide timely information about ongoing initiatives and activities at the U.S. Army Chemical School, periodically updated information is available at <*http://www.wood.army.mil/usacmls/*>.

Dragon's Peak Competition Highlights Chemical Corps Regimental Week

By Master Sergeant Joseph Baker

Twelve Soldiers traveled to Fort Leonard Wood, Missouri, to compete in Dragon's Peak 2006 during Chemical Corps Regimental Week to vie for the titles of Chemical Soldier and Chemical Noncommissioned Officer of the Year. It took three days, seven events, and more than fifteen tasks before the honors were awarded.

The number of competitors this year was lower than the original estimate due to travel curtailment, but the event still proved to be a huge success. Last year, the competition was held at the Soldiers' home stations, and the winners traveled to Fort Leonard Wood to attend the Green Dragon Ball and receive their awards. This year, the competitors completed all tasks at Fort Leonard Wood. And with the location change, came an added time requirement. There was less time to recover between events and very little time to prepare for the next event.

The competition began at 0500 on 25 June with a standard Army Physical Fitness Test. The com-petitors were then split into two groups, one for noncommissioned officers and one for junior enlisted Soldiers. The two groups completed a hands-on exercise where they accomplished five tasks. For the noncommissioned officers, the tasks included preparing a chemical downwind message; preparing a nuclear, biological, and chemical report (which predicts fallout area conditions); using an automated net control device; and conducting a protection assessment test on an M40 protective mask. The Soldiers tasks included performing M40 mask maintenance; performing first aid on a bleeding and severed extremity; preparing an intelligence information report; performing preventive-maintenance checks and services on a high-mobility, multipurpose, wheeled vehicle (HMMWV); and disassembling and reas-sembling an M249 squad automatic weapon.

A Soldier performs first aid on a bleeding and severed extremity.

A Soldier's time is checked during the Army Physical Fitness Test.

Day 1 included a 100-question written test that covered chemical operations, basic Soldier skills, and Army and Chemical Corps history. Day 2 covered navigation operations. With grueling summer heat during the day and almost zero visibility at night, competitors really felt the pressure. On Day 3, competitors appeared before a board of five Chemical sergeants major, where they were asked questions in several different areas (similar to a promotion board).

In the end, two outstanding Dragon Soldiers rose above all others. First-place was awarded to Staff Sergeant Francisco Cardenas, 22d Chemical Battalion, Aberdeen Proving Ground, Maryland, and Specialist Joseph Caouette, 83d Chemical Battalion, Fort Polk, Louisiana. The winners were presented the George L. Murray Leadership Award by Command Sergeant Major Patrick Alston, Regimental Command Sergeant Major, and Command Sergeant Major George L. Murray (Retired).

Command Sergeant Major Alston said that the competition, which has become an annual event that coincides with Regimental Week, would only improve with time. "Next year, we would like to see at least one Soldier from each Chemical battalion and company in the Army," Alston said. "We would also like to increase some of the tasks and make it more demanding."

Staff Sergeant Franscisco Cardenas, Chemical Noncommissioned Officer of the Year, and Specialist Joseph Caouette, Chemical Enlisted Soldier of the Year, receive their awards during the Green Dragon Ball.

Master Sergeant Baker is the Chemical School Operations Noncommissioned Officer. His past assignments include instructor for the Headquarters, Training Command; tactical noncommissioned officer for the Chemical Officer Basic Course; platoon sergeant for Chemical reconnaissance; and division Chemical noncommissioned officer for the 1st Infantry Division. Master Sergeant Baker is the author of Looking Out From Under the Hat.

Sibert Award Winners

The 2006 winners of the Sibert Award are the—

- Active Army: 95th Chemical Company (Heavy), Special Troops Battalion, Fort Richardson, Alaska.
- Reserve Component: 392d Chemical Company (Combat Support), 468th Chemical Battalion, 460th Chemical Brigade, Little Rock, Arkansas.

The companies were presented the awards at the Green Dragon Ball held at Fort Leonard Wood, Missouri, in June. The Sibert Award provides recognition for excellence in the Chemical Corps and gives recognition to the best chemical company-size unit in the Active Army.

The award is named after Major General William L. Sibert—often referred to as the "Father of the Chemical Corps." Major General Sibert, who was elected by General John J. Pershing to stand up the Chemical Warfare Service, guided the Corps through many of its earliest challenges.

Units compete for this highly regarded award based on the following:

- Mission.
- Individual and collective training statistics.
  - Common task testing.
  - Weapons qualification.
  - Army physical fitness test scores.
  - Army Training and Evaluation Program (ARTEP) results.
  - External evaluation/Combat Training Center rotations or contingency missions.
- Overall maintenance status and performance-on-command inspections.
- Accident and award safety performance statistics.
- Overall organizational excellence (based on individual and unit awards).
- Participation in educational programs and community or humanitarian activities.
- Battle-focused future training initiatives.

Officers Explore Lewis and Clark Expedition

By Captain Saepyol Choe Warren

In November 2005, twenty-five officers from the 23d Chemical Battalion participated in a staff ride that followed the Lewis and Clark trail along the Pacific Ocean and Columbia River. Nearly 200 years after the Lewis and Clark expedition, the little towns of Ilwaco, Washington, and Warrenton, Oregon, were bursting with bicentennial celebrations—reenactments, dedications, ceremonies, and tours—and educational information to commemorate the three-year expedition.

"What a great opportunity—to be living in this part of the world on the 200th anniversary of America's greatest expedition. I wanted our officers to understand that the Army Values—[loyalty], duty, [respect], selfless service, [honor], [integrity], and personal courage—so prevalent throughout their [Lewis and Clark] story are timeless and can professionally develop [*sic*] our leaders today," explains the executive officer (XO) of the 23d and the originator of the Lewis and Clark staff ride.

The 23d Chemical Battalion, consisting of Chemical and Engineer officers, visited the historical sites where the Corps of Discovery waited out bad weather for six days on the Columbia River, first sighted the long-anticipated Pacific Ocean, and set up encampment for 106 days in the winter of 1805. The battalion studied the expedition from an Army leadership perspective, deriving lessons from the mission preparation and execution, preliminary training, logistical and intelligence concerns, command and control, civil affairs with Native American tribes, and examples of the Army Values.

Stephen Ambrose's book, *Undaunted Courage*, served as the launching point for discussion, while the Fort Clatsop Visitor Center and Cape Disappointment Interpretive Center fortified knowledge with visual and interactive displays and guided tours.[1] Jill Harding, Chief of Visitor Services at Fort Clatsop said, "What we want people to take from the Lewis and Clark story is teamwork. We always hear about Lewis and Clark—the two captains—but it was more than just two guys—there were thirty-three people in the expedition, and their success cannot be attributed only to the leadership of Lewis and Clark, but to the combined effort of the team." And the same holds true with unit missions. Unit missions succeed only through the dedication of many people across branches and occupations. Working together breeds accomplishment. We see these accomplishments in our daily successes and in the success of the Army, our Nation, and our combined human history.

Aaron Webster, the interpretive specialist at the Cape Disappointment Interpretive Center said that "the people who create history are not superheroes. They're ordinary Americans (like the people who visit our museum) who do extraordinary things. I've heard it said that people like Lewis and Clark don't exist anymore. I think that's dangerous. I want to empower people to believe [that] they can be extraordinary—someone's got to make history. We all participate in what will be written."

"Lewis and Clark were such a small part of the victory, yet their pinprick in time created an incredible ripple throughout history—it's amazing the effect they had," marvels Harding. "They inspire me to work hard, knowing that maybe someday my small victories will have the same effect."

"Of all the stories in history, why are people so fascinated with Lewis and Clark?" asks Harding. "Their expedition epitomizes the American story of how great things come about. They start small; they start with a dream; and they are achieved by a dutiful, loyal, selfless, and courageous team."

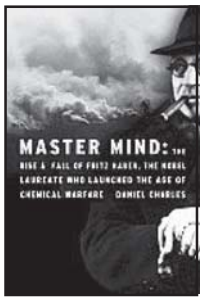
Endnote

[1]Stephen Ambrose, *Undaunted Courage*, Simon & Schuster, January 1996.

Captain Warren is a native Korean from Pusan. She previously served as the adjutant for the 23d Chemical Battalion, Fort Lewis, Washington. She is a graduate of the University of Portland.

Book Reviews

By Mr. Reid Kirby



Mastermind: The Rise and Fall of Fritz Haber, the Nobel Laureate Who Launched the Age of Chemical Warfare, Daniel Charles, Harper Collins, 2005.

Fritz Haber is the father of modern chemical warfare. Like so many of his day, his patriotism was a defining aspect of his character. With dedication, he applied scientific methods to the advancement of Germany in all matters, which rendered him a controversial personality in history.

It would be a serious mistake to dismiss Fritz Haber because of the role he played in German chemical warfare. He was a friend and an intellectual peer of Albert Einstein and was presented the Nobel Prize in 1918. His process of fixating nitrogen from the air and using iron catalysis was instrumental in fertilizer production to support the food supply for more than two billion people and in the production of war explosives.

Daniel Charles's tragic history of this imposing figure in chemistry is easy to read and well balanced. Mr. Haber's Jewish faith forced him to leave Germany when Hitler and the Nazi regime assumed power. The difficulties in reconciling Haber's efforts in chemical warfare during World War I has either erased Fritz Haber from history or reconstructed him as something incomplete.

Poisons: From Hemlock to Botox and the Killer Bean of Calabar, Peter Macinnis, Arcade Publishing, 2004.

This book is recommended for literary buffs. The author starts his book by disputing the accuracy of *Lives of Great Poisoners* (a play by Caryl Churchill), as referenced in *Under Milk Wood* (a play by Dylan Thomas). Through literature, history, and criminal cases, Mr. Macinnis reveals the central theme—the roles that poisons play in civilization. His chemical warfare knowledge is naive at best, but the accounts of crimes involving poisons, the histories of specific poisons, and the efforts required to defrock poisoners has a unique cultural heritage that the Chemical Soldier will appreciate.

Mr. Kirby is a project manager for Strategic Staffing Solutions (S3). He holds a bachelor's degree in valuation science from Lindenwood College, with a minor in biology and special studies in behavioral toxicology and biotechnology.

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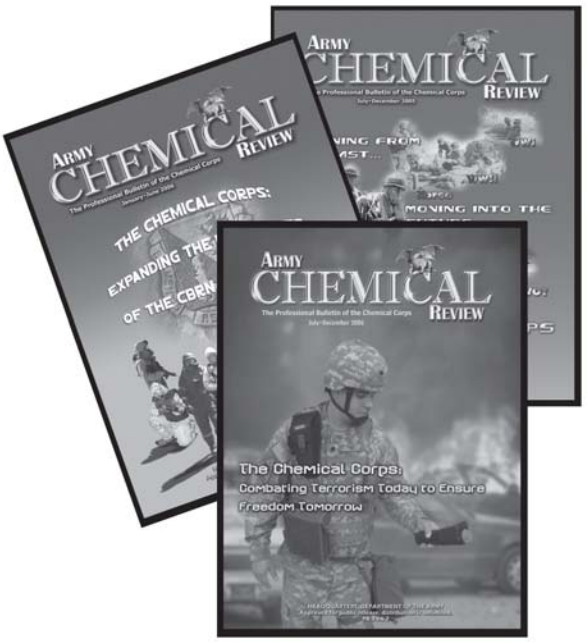

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Articles should be concise, straightforward, and in the active voice. If they contain attributable information or quotations not referenced in the text, provide appropriate endnotes. The text length should not exceed 4,000 words (about eight double-spaced pages). Shorter after-action type articles and reviews of books on CBRN topics are also welcome.

Include photographs (with captions) and/or line diagrams that illustrate information in the article. Please do not insert illustrations or photographs in the text; instead, send each of them as a separate file. Do not embed photographs in PowerPoint or Microsoft Word. If illustrations are in PowerPoint, avoid using excessive color and shading. Save digital images in a TIF or JPG format at a resolution no lower than 200 dpi. Images copied from a Web site must be accompanied by copyright permission.

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